NYS Clean Heat: Statewide Heat Pump Program Implementation Plan

Jointly Filed By:

New York State Energy Research and Development Authority

Central Hudson Gas & Electric Corporation

Consolidated Edison Company of New York, Inc.

Niagara Mohawk Power Corporation d/b/a National Grid

New York State Electric & Gas Corporation

Orange and Rockland Utilities, Inc.

Rochester Gas and Electric Corporation

Filed: March 16, 2020

Updated: April 30, 2020

Case 18-M-0084

Table of Contents

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of a Comprehensive Energy Efficiency Initiative	))	Case 18-M-0084

NYS CLEAN HEAT: STATEWIDE HEAT PUMP PROGRAM

IMPLEMENTATION PLAN

1. Introduction

In its Implementation Order,[1] the New York State Public Service Commission (the "Commission") initiated a common statewide heat pump framework for New York State ("NYS"), designed to guide the efforts of the Electric Utilities[2] and the New York State Energy and Research Development Authority ("NYSERDA") in this area. The Electric Utilities and NYSERDA (collectively, "Joint Efficiency Providers") support the State's ambitious clean energy policies and particularly its efforts to advance the development of energy efficiency resources and building electrification.

This NYS Clean Heat Statewide Heat Pump Program ("NYS Clean Heat Program") Implementation Plan ("CHIP" or "Implementation Plan") is a key element of the State's clean energy pathway and is designed to support customers in transitioning to energy-efficient electrified space and water heating technologies.[3] This CHIP describes the initial steps that the

---

1 Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025 ("Implementation Order") (issued January 16, 2020).

2 Central Hudson Gas & Electric Corporation ("Central Hudson"), Consolidated Edison Company of New York, Inc. ("Con Edison"), Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid"), New York State Electric & Gas Corporation ("NYSEG"), Orange and Rockland Utilities, Inc. ("Orange & Rockland"), and Rochester Gas and Electric Corporation ("RG&E") (collectively, "Electric Utilities").

3 The Joint Efficiency Providers initially filed the CHIP on March 16, 2020. On March 31, 2020, the New York State Department of Public Service Staff ("Staff") issued a letter of approval of the March 16, 2020 CHIP contingent upon the Joint Efficiency Providers submitting a revised CHIP by April 30, with revisions addressing several issues.

Electric Utilities will take, in conjunction with NYSERDA, to expand existing heat pump programs and, in other instances, establish new heat pump programs as part of the new statewide framework. The framework is designed to provide contractors and other heat pump solution providers a consistent experience and business environment throughout NYS. Utility chapters at the end of this Implementation Plan provide further details on elements that are unique to each service territory.

A. Background

The Commission's Implementation Order: (1) approved for each of the Electric Utilities budgets and targets (see Table 1 below) governing the deployment of heat pumps through 2025; (2) required a common statewide heat pump framework recognizing other market enabling actions to be provided by NYSERDA; (3) directed NYSERDA to allocate at least $30 million towards low- and moderate-income ("LMI") heat pump programs; (4) required the establishment of a Joint NYSERDA and Electric Utility Management Committee (the "Joint Management Committee"); and (5) required the filing of a Statewide Heat Pump Program Implementation Plan and Program Manual ("Program Manual") within 60 days of the Implementation Order.

Heat pump deployment targets are expressed in annual energy savings in million British Thermal Units ("MMBtu"), based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

Table 1: Utility Heat Pump Budgets and Targets Established in the Implementation Order through 2025[4]

Utility	Target (MMBtu)	Budget ($millions)
Central Hudson	255,293	$43.2
Consolidated Edison	1,000,000	$227.3
National Grid	1,112,681	$84.4
NYSEG	992,737	$75.1
Orange & Rockland	86,657	$15.0
RG&E	119,223	$9.2
Total	3,566,590	$ 454.3

[4] Implementation Order, Appendix C.

2. Statewide Framework

The Joint Efficiency Providers will implement a common statewide framework to advance the adoption of heat pump systems that are designed and used for heating, integrated under the umbrella of NYS Clean Heat.[5] The NYS Clean Heat Program supports the installation of heat pump technologies that are best suited to heat efficiently in cold climates; requires participating contractors ("Participating Contractors") to follow best practices related to sizing, selecting, and installing heat pumps in cold climates; and promotes consumer education, including required guidance provided by Participating Contractors to customers who have heat pumps installed on how to operate and maintain their system. As part of program delivery, the Joint Efficiency Providers will monitor the extent to which NYS Clean Heat incentivized heat pump systems displace or replace other heating fuels. After reviewing the program's progress, the Joint Efficiency Providers will make adjustments to improve performance as appropriate.

A. Eligible Technologies

The following technologies are eligible for incentives to be offered by the Electric Utilities, according to eligibility criteria specified in Section 2.A[6]:

- Air-Source Heat Pumps ("ASHPs") for space heating applications;
- Ground Source Heat Pumps ("GSHPs") for space and water heating applications; and
- Heat Pump Water Heaters ("HPWHs") for domestic and service water heating applications.

Within this Implementation Plan, incentive structures are described in terms of their applicability to various building types, which are:

- Residential (one to four units);
- Multifamily (five or more units);
- Small commercial businesses ("small commercial"); and

---

[5] In all instances, the NYS Clean Heat Program will provide incentives only for heat pump systems that are designed to provide domestic and service hot water heating and/or both space heating and cooling; or for commercial/industrial process systems that provide water heating and/or cooling. Heat pumps that are used primarily for space cooling are ineligible for incentives under the NYS Clean Heat Program.

[6] As described more fully in Section 4, the Joint Management Committee process will have the flexibility to adopt new approaches/products as necessary.

- Large commercial and industrial building sectors ("C&I").

The Clean Heat Program provides incentives under nine categories reflecting applicable technology type, system size, customer type, and incentive structure. The incentive categories are as follows:

- Category 1 *Cold Climate ASHP ("ccASHP"): Partial Load Heating*
- Category 2 *ccASHP: Full Load Heating*
- Category *3 GSHP: Full Load Heating*
- Category 4 *Custom*
- Category 5 *HPWH (up to 120 gallons of tank capacity)*
- Category 6 *Commercial HPWH (above 120 gallons of tank capacity)*
- Category 7 *GSHP Desuperheater*
- Category 8 *Dedicated Domestic Hot Water ("DHW") Water-to-Water Heat Pump ("WWHP")*
- Category 9 *Simultaneous Installation of Space Heating & Water Heating*

Further detail on specific incentive structures is provided in Table 2 and described below. In general, customers are eligible for incentives under these programs no matter which heating fuel (*e.g.*, fuel oil, natural gas, propane, biomass, electricity) they are either transitioning from or declining to include in a new construction application. For retrofit applications, the pre-existing heating source must be documented. The baseline heating fuel for new construction will be analyzed on a case-by-case basis for the purposes of determining energy and carbon savings, with the default substituted fuel generally determined by contemporary construction practice in the area.

To be eligible for incentives, systems must be sized in compliance with all applicable state and municipal code.[7] Residential heating and cooling equipment and appliances shall be

---

[7] Energy Conservation Construction Code of New York State ("ECCCNYS") 2016, Section R403.7 and 2016 New York City Energy Conservation Code ("NYCECC"), Section R403.7. ECCCNYS 2016 and 2016 NYCECC require that systems serving multiple dwelling units, where commercial code is applicable, follow

sized in accordance with ACCA[8] Manual S or other approved sizing methodologies based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.[9] Applicable exceptions shall apply.

Equipment installed in commercial buildings must be sized in accordance with heating and cooling load calculations following ANSI[10]/ASHRAE[11]/ACCA Standard 183-2007

Under the NYS Clean Heat Program, a full load heating ASHP or GSHP system is defined as a system installed as a building's primary heating source with a total system heating capacity that satisfies 90% -120% of the BHL, in accordance with applicable code. A partial load heating system is installed in addition to an existing heating system and has a total system heating capacity that satisfies <90% of BHL.

2.A.1 **Air Source Heat Pump Systems**

Air source heat pumps typically provide space heating using electricity through vapor-compression refrigeration cycle. These systems extract heat from outdoor air and transfer the extracted heat into the conditioned spaces via various means. They are also used to provide space cooling by reversing the cycle to extract heat from a building and transfer the heat to the outside air.

Under the NYS Clean Heat Program, to be eligible for a program incentive, ASHP systems must: (1) be listed on the Northeast Energy Efficiency Partnership ("NEEP") Cold Climate Air Source Heat Pump ("ccAHSP") Specification and Product List ("NEEP Product List");[12] or (2) for product classes that are commercially available and not covered by the NEEP

Sections C403 and C404 of the respective codes. In general, heat pumps installed in dwellings where residential code is applicable are required to be sized per ACCA Manual S. The intent is to match the equipment capacity closely to the load calculations of ACCA Manual J. In addition to program requirements regarding sizing heat pumps relative to the heating load, Manual S sets a maximum low-speed heat pump cooling capacity of 115% of the total Manual J cooling load for multi-speed or variable-speed heat pumps. As an alternate, if the sensible heat ratio (SHR) is >=95%, the maximum low-speed cooling capacity may be 15,000 Btu/h greater than the total Manual J cooling load for multi-speed or variable-speed heat pumps. For a single-speed water-to-water heat pump utilizing a buffer tank, the limit of 115% applies only to indoor coils that provide cooling from the buffer tank.

8 Air Conditioning Contractors of America

9 2020 Residential Code of NYS, Chapter 14, Section M1401.3 Equipment and appliance sizing.

10 American National Standards Institute

11 American Society of Heating, Refrigerating, and Air-Conditioning Engineers

12 The current specification and listed eligible units are available at: https://neep.org/ASHP-Specification.

Specification and Product List, they must meet the criteria established in this CHIP and the Program Manual.

Several categories of ASHPs are eligible for program incentives. These categories include:

(1) Residential and Small Commercial Central ASHPs;

(2) Ductless or partially ducted mini-split heat pumps ("MSHPs"), which include "single-head" (one indoor air handler per outdoor compressor) and "multi-head" or "multi-split" (more than one indoor air handler per outdoor compressor);

(3) Commercial Unitary (*i.e.*, Large Commercial) ASHPs (Split or Single Package); and

(4) Variable Refrigerant Flow Heat Pumps ("VRFs").

The customer may either decide to keep their existing heating system in service to provide back-up or emergency heat, or to decommission it. The Joint Efficiency Providers acknowledge that the decommissioning of existing systems is the preferred outcome, as long as they are decommissioned legally and safely. The Joint Efficiency Providers will work to educate customers on the benefits of safe decommissioning and to train and refer Participating Contractors to applicable jurisdictional programs, codes and requirements (e.g., federal, state, municipal, etc.) that govern decommissioning and facilitate best practices.[13]

2.A.1.1 Residential and Small Commercial Central Cold Climate ASHPs

Residential and Small Commercial Central ASHPs are typically sized to provide heating and cooling to the whole building through an air duct system.

To be eligible for the NYS Clean Heat program incentives under Category 2 *ccASHP: Full Load Heating* (see Table 2), the central ASHP system must:

- Consist only of heat pump appliances listed as ccASHP in the NEEP Product List, which covers single-phase electricity powered heat pump consumer

[13] *See*, for example, *Amended Notice of Adoption – Rule amending and updating the Uniform Code* applies to "Abandonment or removal of heating oil storage tanks." March 25, 2020. NYS Register (April 8, 2020), pp. 14-22. I.D. No. DOS-14-20-00002-E. https://www.dos.ny.gov/info/register/2020/040820.pdf

products, as defined by Federal standard;[14]

- Have a total system heating capacity that satisfies 90% -120% of BHL, in accordance with applicable code and requirements described in Section 2A; and
- Have a total system heating capacity <300,000 Btu/h.

Central ASHPs with larger capacities than allowed for under this category, or that are powered by three-phase electricity, may qualify for Category 4 *Custom*, which is intended for larger commercial and multifamily projects (see Table 2).

2.A.1.2 Mini-Split Heat Pumps

Unlike central ASHPs, which are typically single-appliance systems, mini-split systems typically comprise multiple single-head and/or multi-head MSHPs. The number of individual MSHP appliances and outdoor units installed in a project is determined by the physical characteristics of the building (*i.e.*, configuration of interior walls separating spaces and layout of zones).

To be eligible for program incentives under Category 1 *ccASHP: Partial Load Heating* or Category 2 *ccASHP: Full Load Heating* (see Table 2), a MSHP system must:

- Consist only of heat pump appliances listed as a ccASHP in the NEEP Product List, which covers single-phase electricity powered heat pump consumer products, as defined by Federal standard;[15] and
- Have a total system heating capacity <300,000 Btu/h.

Qualifying MSHP systems are eligible for one of these two categories of incentives based on their installed heating capacity relative to BHL:

- Category 1 *ccASHP: Partial Load Heating*: MSHP system installed in

---

[14] 10 CFR 430.2 Definitions. Current link: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=29d99fa0a367f0166b9cc8528ad29023&mc=true&n=pt10.3.430&r=PART&ty=H TML#se10.3.430_12. The definition covers single-phase, air-cooled equipment rated below 65,000 Btu/h, and not contained in the same cabinet as a furnace with heating capacity of 225 Btu/h or greater.

[15] *Id.*

addition to existing heating systems, with total equipment heating capacity <90% of BHL. In this application, an existing heating system is kept in operation to provide supplemental heating and/or to provide heating to zones in which the MSHPs are not installed.

- Category 2 *ccASHP: Full Load Heating*: MSHP system installed as a building's primary heating source, designed with multiple indoor units whose total capacity satisfies 90%-120% of BHL. While the program will promote decommissioning of the existing heating system as a best practice, it will not require decommissioning. The customer may opt to keep the existing heating system commissioned as an emergency back-up.

MSHP systems that have individual heat pump appliances that are powered by three-phase electricity, or with larger total system capacities than allowed for under Categories 1 or 2, may qualify for Category 4 *Custom*, which is intended for larger commercial and multifamily projects (see Table 2).

2.A.1.3 Large Commercial ASHPs

Large commercial ASHPs are eligible for incentives under Category 4 *Custom*. A large commercial ASHP system has one of the following characteristics:

- Includes individual heat pump appliances that are powered by three-phase electricity; or
- Has a total system heating capacity ≥300,000 Btu/h.

Large commercial ASHPs are a retrofit solution for businesses and multifamily buildings that currently have rooftop or central air conditioners installed in conjunction with a separate heating system.

The minimum eligibility criteria for commercial ASHPs is equivalent to the ENERGY STAR specification for Light Commercial HVAC, which covers heat pumps with rated capacities ranging from 65,000 Btu/h up to 240,000 Btu/h.[16] For heat pumps with rated

[16] ENERGY STAR "Light Commercial HVAC Key Product Criteria." Current link: https://www.energystar.gov/products/heating_cooling/light_commercial_heating_cooling/light_commercial_hvac_key_product_criteria

capacities of 240,000 Btu/h and above, eligibility will be determined through a site-specific measure analysis.

2.A.1.4 Variable Refrigerant Flow Multi-Split Systems

VRF systems are eligible for incentives under Category 4 *Custom*. They are multi-head MSHP systems incorporating a single refrigerant circuit, with one or more outdoor units, at least one variable speed compressor or an alternate compressor combination capable of varying the system capacity by three or more steps, and multiple indoor air handlers, each capable of individual zone temperature control. In Large C&I and multifamily buildings, VRF systems are more common because the varying flow of refrigerant enables optimized performance across a range of zonal comfort levels and partial load conditions. These systems can be built with heat recovery and cooling capabilities that allow simultaneously heating to some zones and cooling to other zones.

In order to be eligible for the program, VRF systems up to 240,000 Btu/h heating capacity must meet or exceed current ENERGY STAR Light Commercial HVAC Key Product Criteria.[17] For systems with capacities greater than those covered by ENERGY STAR, program eligibility will be determined through a site-specific measure analysis.

2.A.2 Ground Source Heat Pumps

GSHPs achieve high efficiency by exchanging thermal energy with the ground, ground water, or other natural body of water, instead of from outside air. GSHP systems work in cold climates because of their ability to maintain capacity at low ambient air temperature. GSHPs are used in all building sectors and are sized to provide heat to the whole home or whole building. They range from single-appliance systems in residential and small commercial applications that couple one ground loop with one heat pump appliance, to

[17] Like central ASHP, VRF systems are also covered under the ENERGY STAR Light Commercial HVAC, specification: https://www.energystar.gov/products/heating_cooling/light_commercial_heating_cooling/light_commercial_hvac_key_product_criteria

large systems that extend the ground loop into an internal distribution system serving multiple heat pump units, each of which can be individually controlled.

GSHP units may have an optional desuperheater that takes advantage of waste heat generated by the compressor and transfers the waste heat to a domestic hot water system. GSHPs distribute heating and cooling in the building through air or water distribution systems. System performance depends on an effective ground heat exchanger design and system sizing.

GSHPs are eligible for two categories of incentives. To be eligible for incentives in Category 3 *GSHP: Full Load Heating* (see Table 2), the GSHP system must:

- Have a closed loop ground heat exchanger circulating a water/antifreeze mixture or a direct expansion ground heat exchanger;
- Consist only of individual heat pump appliances that are ENERGY STAR certified and meet or exceed ENERGY STAR Tier 3 Geothermal Heat Pump Key Product Criteria.[18]
- Have a total system heating capacity that satisfies 90%-120% of BHL; and
- Have a total system heating capacity <300,000 Btu/h.

Systems that are too large to qualify per the above specifications or that have an open-loop ground heat exchanger may qualify for Category 4 *Custom*.

Ground loops must comply with NYS Department of Environmental Conservation ("DEC") regulations for geothermal well drilling.[19] Closed loop systems must comply with International Ground Source Heat Pump Association ("IGSHPA") design and installation standards. Direct Geoexchange ("DGX") systems must comply with ANSI/CSA C448.8-16, Installation of Direct Expansion Heat Pump Systems and IGSHPA design and installation

---

[18] ENERGY STAR "Geothermal Heat Pumps Key Product Criteria." Current link showing Tier 3 requirements: https://www.energystar.gov/products/heating_cooling/heat_pumps_geothermal/key_product_criteria. Tier 3 specifications can also be found in "Product Specification for Geothermal Heat Pumps: Eligibility Criteria," p. 3. Current link: https://www.energystar.gov/sites/default/files/specs//private/Geothermal_Heat_Pumps_Program_Requirements%20v3.1.pdf

[19] *See*, http://www.dec.ny.gov/energy/43303.html.

standards. Other specific requirements governing installation of ground loops, as well as other system components, are listed in the Program Manual.

2.A.3 Heat Pump Water Heaters and Ground Source Water Heaters

HPWHs are storage tank-based water heaters that typically replace electric resistance storage tank water heaters or fossil fuel-fired storage tank water heaters. These systems provide most of the heat to domestic hot water through a heat pump, with a secondary electric resistance coil as a back-up to ensure that the water temperature meets the desired setpoint during high demand periods. HPWHs can be installed in a variety of conditioned or unconditioned spaces, where there is adequate air supply for heat exchange. HPWHs are available to customers through appliance retail channels and through heating and plumbing contractors.

HPWHs can be used in any type of building. Eligibility to participate in the program is based on ENERGY STAR product criteria, which has both residential[20] HPWH and commercial HPWH[21] categories. Residential and small commercial HPWHs eligible for Category 5 *HPWH (up to 120 gallons of tank capacity)* are residential service systems that have tank capacities of up to 120 gallons, current rating of ≤24 amps and voltage of ≤250 volts.[22] Commercial-duty HPWHs with tank capacities > 120 gallons qualify for Category 6 *HPWH (above 120 gallons of tank capacity)*.

As an additional program incentive, participating contractors who install HPWHs along with ccASHPs that are eligible under Category 2 *ccASHP: Full Load Heating* systems will be eligible for an additional project bonus under Category 9 *Simultaneous Installation of Space Heating & Water Heating.*

In addition to the traditional HPWH units listed above, specific GSHP technologies that also supply domestic or service hot water will be eligible for incentives, including:

1. Category 7 *GSHP Desuperheater* for DHW desuperheaters installed and commissioned as a component within an eligible GSHP system; and
2. Category 8: *Dedicated DHW WWHP* for ground source WWHP systems that fully satisfy domestic or service hot water needs.

---

[20] *See*, https://www.energystar.gov/products/water_heaters/residential_water_heaters_key_product_criteria
[21] *See*, https://www.energystar.gov/products/water_heaters/commercial_water_heaters/key_product_criteria
[22] 10 CFR Part 430, Subpart B, Appendix E

B. Incentive Structure

The NYS Clean Heat Program incentives are designed to provide a consistent statewide approach to supporting the development of the heat pump market in New York, with a focus on promising technologies and applications that do not yet have a strong market presence. The purpose of these incentives is to cost-effectively aid customers in making the transition to energy-efficient electrified heating solutions.

Table 2 provides the overall structure of the incentives that the Electric Utilities will deploy. Incentives will be assessed at least annually to review whether incentives are set at optimal levels to animate the market. Incentive levels are listed in the NYS Clean Heat Program Manual.

Table 2: Incentive Structure and Eligibility Criteria

Category Number	Description	Target Segments	Eligible Technologies	Incentive Structure	Eligibility Criteria
Space Heating and Cooling					
1	*ccASHP: Partial Load Heating*	Residential, Multifamily, Small Commercial	MSHP	$/outdoor condenser unit	• Each unit in system must be on the NEEP ccASHP Product List. • Total heat pump system heating capacity is <300,000 Btu/h • Total heat pump system heating capacity satisfies <90% of the BHL
2	*ccASHP: Full Load Heating*	Residential, Multifamily, Small Commercial	Central ccASHP, MSHP	$/10,000 Btu/h of maximum heating capacity at 5°F as documented on the NEEP Product List	• Each unit in system must be on the NEEP ccASHP Product List. • Total heat pump system heating capacity is <300,000 Btu/h For central ASHPs installed with a back-up furnace in the same cabinet, the back-up furnace must have capacity <225,000 Btu/h. • Total heat pump system heating capacity satisfies 90%-120% of the BHL

Category	Description	Target Segments	Eligible Technologies	Incentive Structure	Eligibility Criteria
Space Heating and Cooling					
3	*GSHP: Full Load Heating*	Residential, Multi-Family, Small Commercial	GSHP	$/10,000 Btu/h of full load heating capacity as certified by AHRI[17]	• Each heat pump in the system must be ENERGY STAR certified and meet or exceed ENERGY STAR Tier 3 Geothermal Heat Pump Key Product Criteria.[23] • Total heat pump system heating capacity is <300,000 • Total heat pump system heating capacity satisfies 90%-120% of the BHL • Ground loops must comply with applicable NY DEC, NYC, and IGSHPA standards • This category covers only ENERGY STAR certified systems with closed-loop ground heat exchangers. Systems that meet ENERGY STAR criteria but are not ENERGY certified and systems with open loop ground heat exchangers may qualify for Category 4, below.
4	*Custom*	Residential, Multi-Family, Small Commercial, Large C&I	Central ccASHP, MSHP, Commercial Unitary Systems, VRF	$/MMBTU of annual energy savings	• All VRF systems • ASHP, MSHP and GSHP systems with three-phase heat pump equipment or with total system heating capacity ≥300,000 Btu/h

[23] ENERGY STAR "Geothermal Heat Pumps Key Product Criteria." Current link showing Tier 3 requirements: https://www.energystar.gov/products/heating_cooling/heat_pumps_geothermal/key_product_criteria. Tier 3 specifications can also be found in "Product Specification for Geothermal Heat Pumps: Eligibility Criteria," p. 3. Current link: https://www.energystar.gov/sites/default/files/specs//private/Geothermal_Heat_Pumps_Program_Requirements%20v3.1.pdf

Category	Description	Target Segments	Eligible Technologies	Incentive Structure	Eligibility Criteria
			and GSHP		• If all individual appliances in a MSHP system in this category are on the NEEP Product List, the system is eligible. • If all individual units in a GSHP system in this category are ENERGY STAR Tier 3 certified, the system is eligible. • Central ccASHP and VRF systems with heating capacities ≥ 65,000 Btu/h and < 240,000 Btu/h must meet or exceed ENERGY STAR Light Commercial HVAC Key Product Criteria.[24] • Installed systems must satisfy the dominant HVAC load for the building, per applicable code. If the building has a higher BHL than BCL, the system must be sized to satisfy BHL. If the building has a higher BCL, the system must be sized to satisfy BCL. • Eligibility for all other systems 1) within this category and 2) other technologies (*e.g.*, commercial water-source heat pump system) will be determined on a case-by-case basis via project-level analysis. • Requires confirmation of projected MMBTU savings to determine incentive amount.

[24] Light Commercial HVAC Key Product Criteria. Current link: https://www.energystar.gov/products/heating_cooling/light_commercial_heating_cooling/light_commercial_hvac_key_product_criteria

Category	Description	Target Segments	Eligible Technologies	Incentive Structure	Eligibility Criteria
Water Heating					
5	*HPWH (up to 120 gallons of tank capacity)*	Residential, Multifamily, Small Commercial	HPWH	$/Unit	• ENERGY STAR Certified HPWH
6	*Commercial HPWH (above 120 gallons of tank capacity)*	Multifamily, Large C&I	HPWH	$/MMBTU of annual energy savings	• ENERGY STAR Certified HPWH
7	*GSHP Desuperheater*	Residential, Multifamily, Small Commercial	Optional component to GSHP systems	$/Unit	• Installed as integral component in an eligible Tier 3 ENERGY STAR certified GSHP
8	*Dedicated DHW WWHP*	Residential, Multifamily, Small Commercial	Dedicated DHW WWHP	$/Unit	• Can be integrated into an eligible ENERGY STAR certified GSHP or installed as a separate, Tier 3 ENERGY STAR certified WWHP. • Must meet 100% of water heating load
Combination					
9	*Simultaneous Installation of Space Heating & Water Heating*	All	HPWH plus others	Additional bonus incentive	• Category 2 ASHP project that opts to add on a HPWH meeting the criteria in Category 5

As shown in Table 2, space heating incentives will be granted on a per outdoor condenser unit basis for partial load applications (Category 1 *ccASHP: Partial Load Heating*) and on a per Btu/h of heating capacity basis for full heating load applications (Category 2 *ccASHP: Full Load Heating* and Category 3 *GSHP: Full Load Heating*). For larger systems that qualify for Category 4 *Custom*, space heating and other custom incentives will be based on the estimated first-year MMBtu savings for the system and customer type, calculating the project's energy savings which accounts for both the decreased fuel and the change in electricity consumed at the customer site. This approach will accommodate more complex measures installed in the market.[25]

As shown in Table 2, Category 9 *Simultaneous Installation of Space Heating & Water Heating* addresses an additional incentive for HPWHs when installed in combination with a full load space heating ASHP application. The purpose of this additional "bonus" incentive is to support full conversion of the building's heating needs to energy-efficient heat pump technologies, including the water heating technologies. It will also help overcome a market barrier represented by HVAC contractors who install heat pumps, but who are unfamiliar with and resist selling, installing and serving domestic hot water systems.

C. Areas for Potential Program Enhancements and Pilots

The Joint Efficiency Providers have considered several technologies and programs for inclusion in the NYS Clean Heat Program beyond those listed in Section 2.A., above, and will continue to explore them going forward, including through the Joint Management Committee process. Additional technologies and applications that will be explored include, but will not be limited to, packaged terminal heat pumps ("PTHPs"); integrated controls for use with MSHP systems; ASHP systems with integrated domestic hot water; and the thermal storage and flexible

---

[25] There may be cases in which incentives for installations for a large C&I customer will be paid using the incentive structure for residential and small commercial customer (Categories 1-3). For example, the applicable electric utility may apply such incentive treatment if a large manufacturing facility were to install an MSHP system that is eligible for Category 1 in an office space within the building. It may also be the case that a residential customer merits a custom incentive based on the size or complexity of the project (Category 4). The Electric Utilities will assess such situations and determine the applicable incentive structure based on the parameters outlined in Table 2.

load attributes of HPWHs. Additional program elements that will be explored include, but will not be limited to, programs to support the removal of existing heating systems for full load ASHP applications, weatherization programs offered in conjunction with heat pump programs, additional midstream offerings beyond those being proposed in the CHIP, and additional LMI-specific program offerings.

Notably, the Electric Utilities will coordinate and collaborate with NYSERDA on its Comfort Home initiative (described in Appendix 1), making customer referrals in their respective service territories and connecting customers who receive "seal and insulate" services through Comfort Home to heat pump incentives that are offered under the NYS Clean Heat Program. Upon completion of the pilot phase, NYSERDA and the Electric Utilities will review results and lessons learned to determine the best path forward in offering weatherization services to customers. Weatherization and building envelope upgrades represent a key opportunity for energy savings and offer synergies when coupled with a properly sized heat pump solution.

NYSERDA and the Electric Utilities likewise will collaborate in developing and evaluating LMI pilots and demonstration programs, to identify replicable models for heat pump deployment in the LMI market segment while maintaining or improving energy affordability. In addition to pilot design, collaboration may include identification of target customers and affordable multifamily buildings, outreach and referrals, marketing, education, and co-funding. Appendix 1 provides further information on planned investments to develop heat pump solutions for the LMI market segment and to inform longer-term utility investment.

Where applicable, the Joint Efficiency Providers anticipate coordinating on certain large-scale, competitively selected demonstration projects, including demonstrations for clean thermal district systems and for low carbon retrofit solutions in big, tall buildings (see Appendix 1). The Joint Efficiency Providers will share insights on new solutions as well as optimize the allocation of customer funding towards heat pump activities.

D. Program Delivery

This section describes the roles of each entity under the Implementation Plan and notes key areas of collaboration among the Joint Efficiency Providers in support of the NYS Clean Heat goals.

The Electric Utilities will serve as program administrators who manage the overall process, delivery, and interactions with customers, contractors and distributors. The Electric Utilities, through their respective implementation contractors, will be responsible for program operations, delivery, and incentive payments, among other responsibilities. To support the NYS Clean Heat Program efforts, the Joint Efficiency Providers will continue to coordinate across a number of areas. Joint efforts include using a common application and developing consistent contractor requirements across the State. The Joint Efficiency Providers have established a consistent incentive structure statewide. The Joint Efficiency Providers' marketing and outreach efforts, described in the Market Development section with additional detail in utility-specific chapters and Appendix 1, will work in alignment to encourage program awareness and promote education in the market.

The NYS Clean Heat program delivery model provides for both customer and contractor incentives that will vary by category, as described in Section 2.B., above. Customers must select eligible heat pump technologies for installation in their homes and businesses. The purpose of customer incentives is to aid customers in making the transition to energy-efficient electrified heating solutions. Heat pump installation contractors also have an important role in driving market uptake of this technology because they have continuous touchpoints with customers from the point of sale to the installation of the equipment. They are critical actors that size and install heat pumps properly as the primary heat source while providing maximum participant comfort and ultimately customer satisfaction.

Distributors' role in the market is to stock and sell highly efficient, qualifying heat pump equipment per NYS Clean Heat requirements to Participating Contractors. Distributors also have strong relationships with manufacturers and can promote the program rules, product eligibility requirements, and industry best practices on both sides of the supply chain. Con Edison and Orange & Rockland will offer distributor incentives, as discussed in the Con Edison and Orange & Rockland Chapter, and the Joint Efficiency Providers will consider potential expansion of distributor incentives statewide.

The Joint Efficiency Providers recognize the importance of supporting quality installations, consumer education, and continuous improvement and will continue to work together to advance these objectives within the Joint Management Committee.

E. Quality Assurance/Quality Control ("QA/QC")

The Electric Utilities will maintain program integrity through the QA/QC process.[26] The Joint Efficiency Providers are working on a proposal to address the QA/QC process, which will be filed by May 15, 2020. Given the importance of a smooth transition from the NYSERDA-administered heat pump programs to the utility-administered NYS Clean Heat Program, NYSERDA will continue responsibility for the initial QA inspections until the New York Department of Public Service Staff ("Staff") accepts the Joint Efficiency Providers proposal.

The QA/QC process has several components, including establishment of program standards and comprehensive field and photo/desk inspections. The inspections will occur: (1) during construction for relevant projects; and (2) after the contractor submits required commissioning and start-up documentation once the system has been installed. QA will occur for every project until the Participating Contractor has a proven successful track record under the incentive program, after which a sampling protocol will be followed.

QA field and photo/desk inspections will be conducted by a qualified independent third party, using comprehensive QA checklists and processes. The QA inspector will utilize the applicable inspection checklist(s) to assess the quality of workmanship of the project installation and will consult program requirements and New York State building codes, National Electric Code, IGSHPA and Manufacturer's Instructions as references. The QA inspector does not inspect projects for purposes of code compliance or enforcement. Following an inspection, the third-party inspector will produce a detailed report and determine whether the project fully complies with all program requirements and meets acceptable standards of workmanship. The QA inspection report will provide all evaluated elements of the project and list any nonconformances identified. Projects that have nonconformances related to critical (health and safety) or major system performance attributes will automatically fail, and, if an emergency situation exists, the

[26] QA refers to the process of field and photo/desk inspections including the resolution of any issues identified during the field or photo/desk inspection. QC refers to the process of administrative review, including application review and design review.

system will be shut down. Projects that have only nonconformances related to minor or incidental attributes may pass or fail based on the number and type of nonconformance observed.

The contractor is responsible for ensuring compliance of the heat pump system installation with all applicable laws, regulations, rules and standards, including requirements of the local Authority Having Jurisdiction ("AHJ"). The contractor is responsible for correcting all nonconformances identified in the QA inspection in the time required. Contractors are required to submit proof demonstrating correction of all items identified. Contractors may also be put on probationary status, suspended or terminated based on the results of QA inspection or violating program requirements.

Contractors will be evaluated and provided with performance feedback through the QA process to support continuous quality improvement. Based upon nonconformance trends identified in the QA inspections, the Joint Efficiency Providers will develop training and resources to recommend to Participating Contractors for continuous improvement. The Joint Efficiency Providers also will work with AHJ officials to offer training with the goal of increasing the familiarity with heat pump technologies and enhancing the quality of code inspections for these new technologies.

F. Contractor Qualification in the Participating Contractor Network

The Joint Efficiency Providers will maintain and post a list of Participating Contractors who will be eligible to install qualifying ASHP technologies and/or GSHP technologies under the NYS Clean Heat Program. Participating Contractors include ASHP installers, ASHP designers, GSHP installers, GSHP designers, and GSHP drillers. All Participating Contractors are eligible to apply for and receive incentives through this program except for GSHP drillers.

All contractors participating the NYS Clean Heat Program must meet qualifications and training requirements as identified in the Program Manual. ASHP contractors must provide a Manufacturer-sponsored Installation Training Certificate or comparable proof of training and agree to review and utilize the NEEP *Guide to Sizing & Selecting Air-Source Heat Pumps in Cold Climates*. GSHP installers must provide a current (and in good standing) IGSHPA accredited installer certificate.

Contractors that are active in NYSERDA's current ASHP and GSHP incentive programs as of March 15, 2020 will be transitioned to the NYS Clean Heat Participating Contractor network in accordance with their current status and the qualifications previously submitted to NYSERDA. Provisional Status contractors will carry over completed project reviews. Once the third project review is completed by either NYSERDA or an Electric Utility, the contractor will be evaluated for Full Status based upon the quality and consistency of the work and full compliance with program rules.

Contractors that have previously received rebates under any NYS Electric Utility heat pump program prior to April 1, 2020 (and have not participated in the NYSERDA programs) will remain eligible through June 15, 2020 to apply for incentives for ASHP installations under Category 1 *ccASHP: Partial Load Heat*ing and Category 2 *ccASHP: Full Load Heating* as outlined in Table 2. Such contractors must apply no later than May 15, 2020 for continued participation in the NYS Clean Heat Participating Contractor network as specified in the Program Manual and summarized below.

Contractors installing only heat pump water heaters are not required to apply for the Participating Contractor network.

In all other instances, contractors must be qualified as a NYS Clean Heat Participating Contractor before they are eligible to apply for and receive incentives through the program. To qualify, new ASHP and GSHP contractors must apply for participation by filling out a Participating Contractor Application, indicating each utility territory the contractor plans to operate in and submitting all required documents and credentials as specified in the Program Manual. Contractors should submit their application package to a single Electric Utility for review, via the contact information provided in the application. The responsible Utility will subsequently notify the other utilities in whose service territory the contractor plans to operate of their eligibility. The Joint Efficiency Providers will work to further streamline this process after program launch.

All Participating Contractors additionally must execute participation agreements with each Electric Utility in whose service territory the contractor plans to operate, to address unique legal terms and conditions. The Joint Efficiency Providers will work to further streamline this requirement after program launch.

G. Savings and Verification

As described below, the Electric Utilities will rely on *The New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs - Residential, Multi-Family, and Commercial/Industrial,* known as the Technical Resource Manual ("TRM") and best practices to estimate savings and verify installations of heat pumps installed through their programs.

2.A.1 **Savings Estimation**

Savings for heat pump installations will be determined using the filed revisions to the TRM, current version 7.0 (recognizing that this may be revised, amended, or superseded) that describe an approach and algorithms for calculating savings for ASHP, Water-To-Air GSHP, and HPWH for either residential or small commercial applications. These equations rely on site-specific inputs for building load and/or employ building type lookups that will be determined through data collected during the application process to allow for savings calculations consistent with the proposed revisions to the TRM.

The TRM equations cover limited use cases with multiple units. For multiple-unit configurations not covered by the TRM, or for larger or custom systems, the Electric Utilities will perform custom analyses to determine savings, consistent with the approaches outlined for custom measures in the TRM.

Utility tracking systems will be configured to capture and collect application information for heat pump programs to facilitate savings calculations and, subsequently, evaluations.

2.A.2 **Statewide EM&V**

The Joint Efficiency Providers commit to support a statewide Evaluation, Measurement and Verification ("EM&V") study for installed heat pump systems which Staff will lead.

The Electric Utilities are filing an applicable Verified Gross Savings ("VGS") Specification as Appendix 2 to this CHIP. This filing is in accordance with CE-08 Gross Savings Verification Guidance provided by NY DPS Staff.[27]

NYSERDA additionally will conduct statewide market assessments of the heat pump industry to guide and inform programs and state policies, working in coordination with the Electric Utilities and Staff to develop the appropriate methods and frequency of this work.

H. Transition

The NYSERDA ASHP and GSHP incentive programs will accept applications until March 31, 2020. Beginning April 1, 2020, new project applications and new Participating Contractor applications will be submitted under the NYS Clean Heat program based on details provided in the Program Manual.

NYSERDA will contact those Participating Contractors with open NYSERDA project applications as of April 1, 2020. For applications that have not yet received payment and have a project status of "Submitted," "Under Review," "Technical Review," or "'Approved," the Participating Contractor will choose to either finish the project under the NYSERDA program rules and incentive amount or cancel the NYSERDA project application and resubmit the project under the NYS Clean Heat: Heat Pump Incentive Program rules and incentive amount. Only projects filed with NYSERDA by March 31, 2020 and completed with the incentive paid by June 15, 2020 will remain in the NYSERDA ASHP or GSHP incentive program. For those projects that cannot be completed within that time frame, NYSERDA shall notify the respective contractors to apply for an incentive under the NYS Clean Heat Program.

Additional utility-specific information regarding this transition is presented in utility-specific chapters.

---

[27] *See*, Clean Energy CE-08 *Gross Savings Verification Guidance* document issued August 23, 2019. Web link http://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/255EA3546DF802B585257E38005460F9?OpenDocument

3. Market Development

NYS Clean Heat further aims to build market capacity to help achieve the State's heat pump targets through 2025, to increase the pool of skilled labor to grow the heat pump industry, to reduce the cost of heat pump installations, and to transform the way that New Yorkers heat and cool buildings (including both space heating and cooling and water heating) through market adoption of energy-efficient cold climate heat pump technologies.

The market development investments focus on critical needs and barriers challenging widespread adoption of building electrification. These include the need to:

- Train and develop the needed clean heating and building electrification workforce.
- Build consumer demand and market confidence and reduce customer acquisition costs.
- Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations.
- Make electrification solutions available for LMI consumers.
- Make products available when and where consumers need them by building the clean heat supply chain.
- Minimize winter electrical peak by investing in demand reducing "heat-pump ready" solutions.

In addition, NYSERDA will be developing a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings, as New York moves toward a low-carbon economy.

Appendix 1 provides an overview of the NYS Clean Heat Market Development Plan, an approximately $230 million investment that will be administered by NYSERDA, in coordination with the Electric Utilities and their affiliate gas companies. Investments in workforce development and consumer education and engagement are central to NYS Clean Heat and are highlighted below.

A. Workforce Development and Training

The Joint Efficiency Providers will partner with businesses, training institutions, and communities to address critical workforce development needs for heat pump installers, drillers, technical sales staff, architects and engineers, building operators, and new market entrants. NYSERDA's *Workforce Development and Training Investment Plan*, dated March 2020, describes its expanded investment of approximately $38 million through 2025 to train and develop

the clean heating and building electrification workforce.[28] This will include NYSERDA support for targeted training and curriculum development to address workforce needs related to the NYS Clean Heat incentive program, including to enable augmented contractor training requirements and for needs identified through the QA process and customer and contractor feedback.

NYSERDA will support the development of manufacturer and distributor training for heat pump installers, such as augmented installation training for ASHPs that includes a cold climate sizing and design focus. Focal areas for training also will include applying Manual J/S or Code-approved equivalent procedures to perform residential load calculations, design of complex systems in large buildings, integrated controls, and technical sales. NYSERDA will provide cost-shared assistance for participating heat pump contractors to pursue training and certification. Additional activities will include: (1) funding for on-the-job training for new hires, with enhanced wage support for businesses that install heat pumps as well as for businesses that employ disadvantaged workers; (2) job fairs in labor-constrained markets; (3) support for HVAC career pathway initiatives; (4) partnerships to advance the skills of building operations and maintenance workers; and (5) targeted community-based training, including in disadvantaged communities.

Heat pump contractors, distributors, manufacturers and trade organizations participating in the statewide heat pump program and other training providers supporting building electrification in NYS can take advantage of multiple Workforce Development Opportunities currently provided by NYSERDA. Workforce development investments will focus on enabling current and future workers to develop the skills and hands on experience needed to deliver clean heating and building electrification solutions, and will place emphasis on activities that target veterans, low-income workers, and other disadvantaged workers.

---

[28] All referenced NYSERDA Clean Energy Fund ("CEF") Investment Plan Chapters, are publicly filed in NYS PSC Case 14-M-0094 and posted at www.nyserda.ny.gov/cef.

B. Consumer Education and Engagement

The Joint Efficiency Providers will collaborate to deliver a statewide consumer awareness, education, and marketing effort to encourage heat pump adoption. This will complement utility efforts to reach their customers directly with targeted offers.

Consumer education and marketing will focus on maximizing the benefits of heating with heat pumps, communicating the economic benefits, the comfort benefits, and the environmental benefits of heat pumps when they are used effectively for heating. This effort will include:

- Promotion of full-load solutions that allow the customer to retire old fossil fuel systems, and tips on how to dispose of them properly, including access to contractor services and programs that facilitate removal.
- Educational materials providing tips on how to effectively control heat pumps, in order to maximize energy performance without compromising comfort.
- Materials promoting the installation of heat pump water heaters, especially when old fossil heating systems are being replaced by heat pumps, in order to prevent the orphaning of fossil fuel water heaters on existing chimneys, which could lead to unsafe conditions.
- Materials promoting weatherization to make homes and buildings "heat pump ready" and maximizing the comfort, energy and environmental benefits of the improvements. This will include publicizing NYSERDA's Comfort Home Pilot, as appropriate.

NYSERDA's *Clean Heating and Cooling Investment Plan* describes its approximately $19 million investment through 2025 across both consumer education and marketing campaigns (to be coordinated and co-branded with the Electric Utilities) and enhanced Co-op Advertising with industry partners, which will be aligned with an additional $10 million investment in Community Campaigns. These efforts are central components of a broader strategy to build consumer demand and market confidence around clean heating and cooling solutions and to reduce customer acquisition costs for installers, which is funded through NYSERDA's Clean Energy Fund CEF and summarized in Appendix 1.

NYSERDA and utility co-branded marketing activities will provide customers with a trusted source of information before and during their decision to purchase an energy efficient, cold climate heat pump. Co-branded marketing will focus on consumers who have a higher propensity to adopt clean heating and cooling technologies, in particular, reaching customers based on characteristics of their home and heating fuel and reaching customers who are actively searching to replace their HVAC equipment. Additionally, broad reach media will be deployed

in higher opportunity geographies. While utility-specific heat pump program information will be available on each of the Electric Utilities' websites, NYSERDA will establish a central online landing environment that will help drive customers to qualified contractors by segmenting the customer offers based by utility company and geography. Coordination between the Joint Efficiency Providers and industry partners will deliver aligned messaging across the State.

Additional information regarding utility specific customer education and outreach is presented in the utility-specific chapters.

4. Joint Management Committee

This section provides initial description of the Joint Management Committee. The Joint Efficiency Providers will create and file by June 15, 2020 a companion document that provides additional details on topics including, but not limited to: how the Joint Management Committee will operate; the membership and chairs of the committee; committee process and procedures; and contact information for interested parties. Details regarding the frequency of meetings and the subject matter to be covered also will be addressed in the filing.[29]

A. Overall Structure, Governance, and Flexibility

4.A.1 Purpose

The Joint Management Committee will provide the Joint Efficiency Providers and Staff the ability to closely coordinate and improve heat pump efforts across the State.[30] This Committee will be responsible for reviewing and maintaining the NYS Clean Heat program.

4.A.2 Participants

The Joint Management Committee will consist of the Electric Utilities and NYSERDA. Staff will provide an oversight and consultative role on the Joint Management Committee. Consistent with the Implementation Order, Joint Management Committee activities will also

---

[29] The Joint Management Committee will meet monthly and will review program performance and significant program changes at least annually.

[30] Implementation Order, pp. 83-84.

include consultation with gas utilities in gas supply-constrained areas as well as engagement with the Long Island Power Authority for shared learning and to align heat pump related activities.

4.A.3 **Functions**

The Joint Management Committee will work in a collaborative manner to develop and maintain a common statewide program design and focus on technical and operational aspects of program administration. It will manage a process for qualifying contractors in different territories as well as reviewing contractor performance to ensure high quality installations.

The Joint Management Committee will also develop and maintain a process for making ongoing changes to the program including incentive structure, eligible technologies, program rules and other program features in order to be responsive to technology and market developments and maintain market confidence and stability. As part of this process, the Joint Management Committee will periodically obtain feedback from contractors regarding program progress.

If program or process changes are warranted the Joint Management Committee will: (1) gather market data; (2) provide notice to market participants, other stakeholders, and Staff; and (3) consult with market participants, other interested stakeholders, and Staff. Notice will be provided in advance of substantive changes. Substantive changes will be reflected in a revised Implementation Plan, which will be jointly filed by the Joint Efficiency Providers for approval by Staff, or in a revised Program Manual, which will be jointly filed following Staff consultation and approval.

The Joint Management Committee will also provide periodic opportunities for market participants and other stakeholders to offer input and suggestions for improvement to the NYS Clean Heat incentive program and market development initiatives. In particular, the Joint Management Committee will seek input from participants in the Performance Management and Improvement Process that will be convened by Staff. Following meetings or forums convened to solicit input from stakeholders, whether in advance of a specific program change or for broader input into the NYS Clean Heat initiatives, the Joint Management Committee will provide the Commission a summary report to be published on the Commission's Document and Matter Management (“DMM”) System.

A foundational function of Joint Management Committee will be to support and maintain feedback loops between the utility-led and NYSERDA-led components of the NYS Clean Heat Program. As is reflected in all elements of this Implementation Plan, the Joint Efficiency Providers, together and with other stakeholders, will identify and execute optimal approaches to achieve the NYS Clean Heat goals in transitioning New Yorkers to energy-efficient electrified space and water heating technologies.

5. Utility-Specific Elements and Activities

A. Central Hudson Chapter

This chapter of the Implementation Plan will explicitly discuss Central Hudson's plans to meet the ordered MMBtu goal, and includes information on budgets and targets, incentive amounts, predecessor program, transition details, Earnings Adjustment Mechanisms ("EAMs"), and coordination with the other gas utilities.

5.A.1 Budgets and Targets

Central Hudson was authorized a budget of $43.2M to achieve 255,292 Gross MMBtu of savings beginning April 1, 2020 through December 31, 2025. The below table outlines the annual funding and savings targets identified in the Implementation Order:

Table 3: Central Hudson 2020-2025 Heat Pump Budgets and Targets[31]

Central Hudson	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	$3,354,852	$5,559,173	$7,049,949	$8,265,836	$9,186,504	$9,804,997	$43,221,311
Base Target (MMBtu)	17,728	30,183	38,850	48,190	56,479	63,863	255,293

5.A.2 Transition Plans

Central Hudson has been promoting ASHP within its Environmentally Beneficial Electrification ("EBE") program since July 1, 2018. The program incentivizes both ductless and ducted ASHP in residential fuel switching applications. Central Hudson has established an extensive partnership with several hundred local contractors to implement this program. The program also promotes ground source heat pumps but does not have a direct incentive. Instead, customers can qualify for a $264 rate impact credit ("RIC") by installing equipment that meets NYSERDA's Geothermal Rebate Program requirements and enrolling in Central Hudson's

[31] MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

Insights+ program.[32] Following the implementation of the NYS Clean Heat program, customers can instead qualify for this RIC by participating in the NYS Clean Heat program, and enrolling in Insights+.[33]

Small and medium businesses ("SMB") and commercial and industrial ("C&I") customers are currently eligible to receive incentives to install high efficiency heat pumps within the Company's energy efficiency portfolio.

The NYS Clean Heat program will replace all of Central Hudson's existing heat pump initiatives on April 1, 2020. Program rules and incentive structures will be consistent with NYS Clean Heat and as such will vary from the programs available prior to April 1, 2020. The Company will consolidate offerings within the new program, make them more inclusive by allowing participation of all electric customers, and implement an incentive structure that better addresses the MMBtu targets of the statewide framework. The NYS Clean Heat program will promote energy-efficient electrified space and water heating technologies across all customer sectors. Central Hudson has also designed a Fuel-Savings Calculator[34] page to estimate the costs and potential savings of converting a home's primary heating source to electric heat pump alternatives. Current Participating Contractors will be eligible to participate in the NYS Clean Heat program. In coordination with the Joint Efficiency Providers, Central Hudson will provide robust training to Participating Contractors to develop proficiency in the applicable technologies, program rules and procedures, and quality installation practices.

Central Hudson is currently exploring cost-effective weatherization offerings in conjunction with heat pumps to benefit customers. Central Hudson will coordinate with

---

[32] More details regarding Central Hudson's Geothermal Rate Impact Credit can be found in Section XXII of the Company's Joint Proposal, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={13CED81C-066E-48ED-A795-9D7300C4587F}

[33] Insights+ is an offering provided on the CenHub Platform that allows customers the ability to enroll in a voluntary, subscription-based service that introduces enhancements to the current Insights experience. The program includes replacement of the customer's existing house meter with an Insights+ meter, enabling the customer to view hourly usage data.

[34] https://www.cenhud.com/my-energy/save-energy-money/energy-calculators/fuel-switching-calculator/

NYSERDA on insights learned from Comfort Home to achieve synergies with installed heat pump solutions.

5.A.3 **Marketing and Outreach**

Central Hudson's marketing and outreach efforts will include targeted direct mail, email campaigns, program information sheets, in-store point of purchase signage, newsletter inserts, printed, digital and radio advertisements, bill inserts and participation in public events.

Messaging will continue to focus on environmentally beneficial electrification and educating consumers on the benefits of converting from fossil fuel heating systems to cleaner and more efficient energy alternatives. Educational content will be developed and shared with partnering local contractors, who will be encouraged to distribute the information to their customers. Employees who have knowledge of the Clean Heat Program and incentives will represent the company at conferences, county fairs, expos, trade shows and other events. Central Hudson will continue to work with and develop relationships with HPWH manufacturers and distributors to expand the promotion of ductless systems, concentrate on carbon reduction benefits and cobrand with participating retailers and manufactures.

Central Hudson will explore future opportunities to collaborate with NYSERDA. This can include outreach and education for low- to moderate-income customers and contractor education on NYSERDA energy audits and heat pump-ready homes and other buildings. In addition, Central Hudson will also work closely with neighboring utilities in areas where customer territories overlap, to ensure consistent messaging and efficient marketing efforts take place.

In some cases, Central Hudson will promote heat pump technologies to targeted areas where updating or extending natural gas is not cost effective.

5.A.4 **Earning Adjustment Mechanisms**

Included in Central Hudson's current Rate Plan,[35] Central Hudson has an EAM active for program years 2018-2021 applicable to heat pump installations. Within the Environmentally Beneficial Electrification EAM, each ASHP and GSHP installation is multiplied by the agreed avoided lifetime short tons of carbon dioxide (Appendix W of current Rate Plan), to calculate the associated carbon reduction. The Environmentally Beneficial Electrification EAM also includes carbon reductions from Electric Vehicles (EVs). In program years 2020 and 2021, the Company will count the MMBtu savings from all eligible equipment under the Statewide Program towards the Statewide Program targets and will also count the carbon savings for each eligible heat pump installation from any eligible customer type [excluding Heat Pump Water Heaters (HPWH)] installed towards the Beneficial Electrification EAM using the existing EAM calculation.

Central Hudson will likely propose new EAMs related to heat pump technologies in its next rate filing.

5.A.5 Coordination with Gas Constrained Areas and/or Non-Pipeline Alternatives

In some cases, heat pump technologies would be leveraged to address gas distribution or transmission system needs. Through a separate funding stream, Central Hudson currently has a framework to implement Non-Pipes Alternative ("NPA") program[36] to defer or eliminate the need for pipeline infrastructure projects. The Company is currently implementing its first NPA designed to eliminate the need for certain leak prone pipe ("LPP") replacements planned throughout their service territory. This type of NPA project, referred to as "Transportation Mode Alternative," requires the conversion of existing natural gas customers to high efficiency heat pumps and electric water heating, so that natural gas is no longer needed. Future constraints and NPA's may be addressed with heat pump solutions and will be developed on a case by case

---

[35] Case 17-E-0459, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service,* Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan. (Issued and Effective June 14, 2018)

[36] See, Order: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={9E4F3908-1FBC-4F49-AB00-FDFE18D5586F}
Attachments: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={13CED81C-066E-48ED-A795-9D7300C4587F}

basis. Where applicable, customers within these project areas may receive additional “kicker” incentives for these technology types to promote program participation.

B. Con Edison and Orange & Rockland Chapter

This section describes Consolidated Edison Company of New York, Inc. ("Con Edison") and Orange and Rockland Utilities, Inc. ("O&R") (jointly, "CECONY/O&R")[37] expanded heat pump program offerings under the statewide heat pump framework. These programs are designed to serve CECONY/O&R's diverse customer base and reflect the unique needs of its respective service territories while supporting attainment of the Statewide Heat Pump target. The following describes CECONY/O&R's respective program characteristics, including program delivery mechanisms, incentive levels, and NYSERDA program transition plans; this section will also detail the coordination efforts necessary to respond to gas supply constrained areas.

5.B.1 Budget and Targets

Table 4: Con Edison and O&R 2020-2025 Heat Pump Budgets and Targets[38]

		2020	2021	2022	2023	2024	2025	Total
Con Edison	Base Budget	$18,037,338	$29,128,534	$35,884,450	$42,823,631	$48,526,394	$52,915,488	$227,315,835
	Base Target (MMBtu)	72,921	119,716	151,334	186,941	219,927	249,162	1,000,000
O&R	Base Budget	$1,236,326	$1,973,311	$2,397,539	$2,828,131	$3,164,633	$3,403,947	$15,003,887
	Base Target (MMBtu)	6,440	10,421	13,027	16,109	18,912	21,748	86,657

With respect to the Implementation Order budgets and targets, Con Edison will also dedicate a minimum of $56.8 million towards heat pump installs in the Brooklyn Union Gas Company d/b/a National Grid ("KEDNY") service area.

5.B.1.1 Midstream distributor component

In addition to the program structure components discussed in the Incentive Structure section, CECONY plans to continue offering a midstream distributor incentive and O&R will begin offering a midstream distributor incentive in 2020. O&R will utilize CECONY's existing

[37] O&R and Con Edison are utilizing the same implementation contractor and will share similar program designs. Any differences will be identified in this chapter.

[38] MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

program infrastructure currently in the market to provide a distributor incentive and promote best stocking practices of qualifying heat pump technology. The new distributor incentive will be offered for NEEP ccASHP qualified products that distributors sell to contractors. The goal of this incentive will be to promote the availability of NEEP-qualified products that meet program efficiency and performance standards of the program. As CECONY/O&R refines its approach to midstream distribution, it will share its market insight and experience with the other Joint Efficiency Providers.

5.B.2 **Transition Plans**

CECONY/O&R are currently offering a variety of incentives for heat pumps in their existing Energy Efficiency programs. In many instances, customers are also leveraging the ASHP and GSHP incentives provided by NYSERDA. Going forward, CECONY/O&R will continue to offer heat pump incentives across their service territories.

CECONY/O&R will roll out their new heat pump programs on April 1, 2020. Contractors interested in participating are encouraged to sign up under the new statewide approach. Current Participating Contractors in the CECONY/O&R programs will be grandfathered into the new program design to accommodate the transition to the larger statewide requirements.

5.B.3 **Marketing and Outreach**

CECONY/O&R's marketing and outreach strategy will include a variety of printed and digital channels based on customer segment, contractor awareness and technology type. All program requirements, incentives and participation guidelines will be included on the program heat pump webpages. The program team will develop printed educational materials which may include fact sheets highlighting technology benefits and point of purchase ("POP") materials advertising rebates in big box retailers. CECONY/O&R will also consider creating materials for direct mail campaigns (letters, post cards) to customers with a high propensity for heat pump adoption who have not recently participated in a previous heat pump program.

CECONY/O&R will continue to participate in regional community outreach events including home shows and conferences to promote heat pump incentives. O&R has also developed and

published a Heating Comparison Calculator[39] to the program website comparing the costs of fossil fuels technologies to electric heat pump alternatives; CECONY is reviewing the tool for future consideration and applicability throughout New York State.

CECONY/O&R will also engage the market through email, digital and social media campaigns. Emails will be sent to eligible customers to promote incentive amounts and educate customers on eligible heat pump technology. Contractors and distributors will also receive relevant program information via email in addition to direct mail options, website, webinars and in-person contractor events. Digital and social channels may include banner ads and social media ads/video clips on Instagram and Facebook platforms as well as paid search terms. Marketing efforts will pursue opportunities to cobrand and collaborate with NYSERDA and other relevant stakeholders including National Grid for customers in shared territories areas.

5.B.4 **Earnings Adjustment Mechanisms**

For Con Edison, between 2020 and 2022, its 2019 Rate Plan[40] included three earnings adjustment mechanisms that focus on savings associated with heat pump use. These EAMs include Share the Savings ("STS"), Deeper Energy Efficiency Lifetime Savings ("DEEL"), and Beneficial Electrification ("BEEL") EAMs. The STS EAM is designed to reduce unit costs for the Company's combined electric and gas energy efficiency portfolio, which includes heat pumps. The DEEL EAM is designed to drive achievement of energy efficiency savings from "deep" measures, which includes heat pumps and heat pump related envelope measures. The BEEL EAM is designed to encourage company-wide efforts that will result in adoption of beneficial electrification technologies, including heat pumps, which lead to a decrease in lifetime CO2 emissions.

For O&R, during 2020 and 2021, its 2018 Rate Case[41] included one EAM, Environmentally Beneficial Electrification ("EBE"). The EBE EAM is designed to encourage O&R company-

---

39 www.oru.com/en/save-money/estimate-your-energy-usage

40 Case 19-E-0065, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service*, Order Adopting Terns of Joint Proposal and Establishing Electric and Gas Rate Plan, issued January 16, 2020.

41 Case 18-E-0067, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Electric Service,* Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans, issued March 14, 2019.

wide efforts that will result in increased adoption of beneficial electrification technologies, including heat pumps and electric vehicles, which lead to a decrease in lifetime CO2 emissions.

In future rate cases, CECONY/O&R will provide initial testimony and work with Staff and other stakeholders on the development of future appropriate EAM structures to encourage the adoption of heat pumps.

5.B.5 **Coordination with Gas Utilities in Gas Supply Constrained Area**

As per the December 2018 New Efficiency: New York Order,[42] Con Edison is fuel agnostic with respect to a customer's heating fuel source, which include fossil fuel customers such as propane and oil. Oil customers have higher baseline costs including oil deliveries and maintenance that would make them prime candidates for whole home electrification.

Con Edison is also committed to supporting customers affected by natural gas constraints, both in its own gas service territory and in areas where it provides only electric service. The Company's Smart Solutions and Non-Pipeline Solutions programs have already begun advancing the adoption of heat pumps in Westchester County and New York City. The Company's heat pump programs described herein will be coordinated with and complement these programs, further expanding support for affected customers. As noted earlier, Con Edison is also committed to "a minimum of $56.8 million towards the installation of heat pumps in the KEDNY service area." Con Edison is committed to working with National Grid and will provide electric heat pump offerings to Con Edison electric customers that reside within National Grid's New York City gas territories (Brooklyn, Queens, and Staten Island). Con Edison will work with National Grid to identify interested customers and record the uptake in heat pump adoption. To that end, Con Edison has been in discussions with National Grid to set up a customer referral process and is working to finalize the process which may include direct, collaborative marketing and outreach.

---

[42] Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Adopting Accelerated Energy Efficiency Targets (issued December 13, 2018).

C. National Grid Chapter

This chapter provides information specific to Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") regarding its implementation of the NYS Clean Heat Program as described above in the CHIP. Included herein are National Grid's program budgets and targets, transition plans from its predecessor Electric Heat Initiative[43] (marketed as the Electric Heat and Products Program), marketing and outreach, EAMs, and coordination in gas-supply constrained areas.

5.C.1 Budgets & Targets

Table 5: National Grid (Niagara Mohawk) 2020-2025 Heat Pump Budgets and Targets[44]

National Grid	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	$6,983,416	$11,891,672	$14,789,044	$16,424,789	$17,190,980	$17,118,933	**$84,398,834**
Base Target (MMBtu)	71,239	132,010	172,203	210,694	245,889	280,647	**1,112,681**

5.C.2 Transition Plans

National Grid will be adopting the NYS Clean Heat Program framework beginning on April 1, 2020. There are differences between the Electric Heat Initiative currently being operated by National Grid and the new NYS Clean Heat Program. Certain aspects of the NYS Clean Heat Program framework will require the Company to transition over a longer time frame and are discussed below. National Grid also commits to continue working with the Electric Utilities to

[43] The Electric Heat Initiative, established in Niagara Mohawk Power Corporation's Joint Proposal, was part of the Electric Customer Products which also included the Electric Transportation Initiative and was designed to encourage customers to convert to efficient electric heat pumps when replacing older, less efficiency and more carbon intensive heating equipment. The initiative provided rebates to promote the installation of electric heat pumps so as to accelerate efficiency heat electrification in support of New York State's climate goals. Case 17-E-0238- *Proceeding on Motion of the Commission as to the Rates, Charges, Rules, and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service*, Joint Proposal, (issued January 19, 2018), pp. 105-106.

[44] MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site

enhance its heat pump program, align on a statewide approach, and to create ease of use for program participants.

5.C.2.1 Significant Differences between the Expiring Electric Heat Initiative and the NYS Clean Heat Program

The most significant differences between National Grid's expiring Electric Heat Initiative and the new NYS Clean Heat Program as implemented by National Grid include:

1. Higher incentive levels for eligible equipment will be offered. See incentive details in the NYS Clean Heat Program Manual.
2. Participating Contractors will be able to retain a Participating Contractor Reward. See incentive details in the NYS Clean Heat Program Manual.
3. Eligibility will be expanded to include small business, and large commercial and industrial customers.
4. The NYS Clean Heat Program will not be limited by existing fuel source.
5. Only those contractors who have met specified training and other requirements will be able to participate in the NYS Clean Heat Program. See section F above for eligibility requirements.
6. There will be a more rigorous QA/QC process for the heat pumps installed pursuant to the NYS Clean Heat Program, including processes to ensure the heat pumps are installed in accordance with industry best practices.
7. After a short transition period (as noted below), National Grid will no longer provide the directly installed electric products provided for free through the Electric Heat Initiative (*e.g.*, low-flow shower heads, faucet aerators, LED lightbulbs, pipe wrap).

5.C.2.2 Application Acceptance

Applied to NYSERDA and Electric Heat Initiative

Contractors who have submitted projects to NYSERDA before April 1, 2020, and that are paid before June 15, 2020, are not eligible to receive the NYS Clean Heat Program incentives that begin April 1, 2020. However, National Grid will honor the Electric Heat Initiative

incentive amounts for applications received through April 15, 2020. After April 15, 2020, projects paid by NYSERDA cannot receive additional incentives paid by National Grid.

Applied to Electric Heat Initiative Only

All applications approved after April 1, 2020, will be awarded the National Grid associated incentive amount listed in the table pursuant to the NYS Clean Heat Program Manual.

Electric Products coordination with the Electric Heat Initiative

National Grid will continue to provide free, directly installed, electric products for all applications submitted using the expiring Electric Heat Initiative application form that are received before June 15, 2020. National Grid will not provide such free electric products for the NYS Clean Heat Program application forms received after April 1, 2020.

5.C.4. 2 Coordination with Utilities in Neighboring Territories

National Grid will continue to coordinate closely with NYSEG/RGE and Central Hudson in areas where the three companies share customers (*i.e.*, where one utility may be the gas service provider, and another, the electric service provider) to create consistency. National Grid, Central Hudson, and NYSEG/RGE will have the same Participating Contractor Reward amounts (*i.e.*, the portion of the incentive contractors are able to retain). National Grid and NYSEG/RGE will have the same incentives and a joint incentive application. As National Grid and NYSEG/RGE move forward in building out the NYS Clean Heat Program, they will work together where possible to create efficiencies in program operation and delivery.

5.C.3 Marketing and Outreach

National Grid will work with the Electric Utilities and NYSERDA on awareness, education, and marketing as described above in the Consumer Education and Engagement Section. National Grid expects to continue its marketing partnership with NYSERDA by sharing costs on a co-branded customer campaign which will provide greater visibility and support education goals cost-effectively. National Grid will also perform its own utility specific targeted marketing to its customers.

National Grid will target both customers and contractors to generate awareness, increase product education, and increase demand by broadly sharing rebate information to encourage participation in the NYS Clean Heat Program.

Various marketing awareness tactics will be explored, including email, paid search and other digital channels, partnerships, and cross-promotional opportunities with relevant customer programs, including Home Energy Reports, online assessments, and the Company's online marketplace.

The Company will leverage the NYS Clean Heat Program web pages to increase educational content and improve the web experience by offering customers relevant information on new technologies, as well as product and customer benefits.

Direct marketing efforts such as email and direct mail, will be key, particularly during shoulder seasons when customer attention to weather and savings is heightened.

5.C.4 **Earnings Adjustment Mechanism**

As filed in the Niagara Mohawk Joint Proposal,[45] National Grid has an EAM active for program years 2018-2020 that applies to heat pump installations, which is known as the Beneficial Electrification EAM, and is measured via a carbon metric. Each ASHP and GSHP heat pump unit installed is multiplied by an agreed upon carbon factor 52.5 MTCO2 and 125 MTCO2 respectively, to determine the total heating electrification carbon reduction. The Beneficial Electrification EAM is combined with carbon reductions from Electric Vehicles and is compared against the minimum, mid, and maximum targets to determine the Company's earnings. In program year 2020, the Company will count the MMBtu savings from all eligible equipment under the NYS Clean Heat Program toward that program's targets and will also count carbon savings toward the Beneficial electrification EAM from each eligible heat pump unit

[45] Case 17-E-0238- *Proceeding on Motion of the Commission as to the Rates, Charges, Rules, and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service*, Order Adopting Terms of Joint Proposal and Establishing Electric Rates, (issued March 15, 2018), Attachment 1, Appendix 7, pp. 4-6.

installed for any eligible customer type (excluding HPWHs), using the pre-agreed upon carbon factor from the Niagara Mohawk Joint Proposal.

National Grid will be proposing new EAMs related to heat pump technologies in its next Niagara Mohawk Power Corporation d/b/a National Grid rate case filing, which are expected to take effect in program year 2021 and be effective for the additional approved rate years.

5.C.5 **Coordination in Gas-Supply Constrained Areas**

In the Brooklyn Union Gas Company d/b/a National Grid ("KEDNY") gas service territory, KEDNY will support the New York State carbon reduction goals and Con Edison in their requirement to dedicate $56.8 million toward the installation of heat pumps in the KEDNY gas service territory.[46] National Grid will coordinate with Con Edison to develop a lead referral process for customers that are interested in alternative methods to gas heating and water heating and/or installing electric heat pump technologies.

In the KeySpan Gas East Corporation d/b/a National Grid ("KEDLI") gas service territory, KEDLI will support New York State's carbon reduction goals and coordinate with PSEG Long Island to develop a lead referral process for customers that are interested in alternative methods to gas heating and water heating and/or installing electric heat pump technologies.

National Grid will coordinate with all other gas utilities in gas supply-constrained areas of its electric service territory to support the installation of electric heat pump technologies to help alleviate gas supply-constraints. The Company may also consider an enhanced incentive for heat pump installations in gas-supply constrained areas.

[46] Implementation Order, pg. 57-58.

D. NYSEG and RG&E Chapter

This chapter provides information specific to the unique activities conducted by New York State Electric & Gas ("NYSEG") and Rochester Gas & Electric ("RG&E") (together and collectively, the "Companies,") under the Statewide Plan, including program budgets and targets, transition details, and program outreach.

5.D.1 Budgets and Targets

Table 6: NYSEG 2020-2025 Heat Pump Budgets and Targets[47]

	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	$6,204,522	$10,605,014	$13,173,160	$14,628,326	$15,300,267	$15,219,288	**$75,130,577**
Base Target (MMBtu)	63,614	117,911	153,328	187,944	219,558	250,383	**992,737**

Table 2: RG&E 2020-2025 Heat Pump Budgets and Targets

	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	$747,986	$1,278,915	$1,611,466	$1,799,548	$1,900,472	$1,909,389	**$9,247,775**
Base Target (MMBtu)	7,541	14,206	18,304	22,468	26,422	30,282	**119,223**

5.D.2 Transition Plans

NYSEG and RG&E have an active solicitation to hire a permanent implementation contractor for the program. The selected vendor is expected to take over implementation during the fourth quarter of 2020. The transition is therefore split into two Phases. Phase 1 will be the initial program transition during the second and third quarter, while Phase 2 will represent the transition to a new program implementer in fourth quarter.

5.D.2.1 Phase 1. Initial Program Transition

[47] MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site

During Phase 1, the Companies will use an existing vendor to process incentive payments as prescribed in Program Manual. These incentives will be available on April 1, 2020. Applications submitted to NYSEG or RG&E with equipment installed prior to April 1, 2020 will utilize existing incentives in the Residential Rebate program with the opportunity to take advantage of NYSERDA incentives.

NYSEG and RG&E have worked with National Grid to have a common incentive application for processing payments during this Phase. Contractors will submit applications on behalf of the customer. For Phase 1, these will be paper applications. The Companies will follow the policies and procedures regarding incentive payments as outlined in the program manual.

The Companies will work with NYSERDA to continue the QA/QC process and Participating Contractor Network in alignment with the Program Manual during this Phase.

5.D.2.2. Phase 2. New Program Implementer

After the completion of the solicitation, the new implementation contractor will assist the Companies in meeting the full scope of the program. The Companies will transition QA/QC activities and the Participating Installer Network from NYSERDA. QA/QC activities will take place as laid out in the guidelines and requirements established in the Program Manual. The implementation contractor will be trained and prepared to assume incentive processing and customer/contractor service. As part of Phase 2, the Companies will implement online applications for rebates and contractor network. As the Companies and National Grid continue building the Statewide Program, they will work together where possible to create efficiencies in program operation and delivery.

As part of assuming the full scope of the program from NYSERDA, the Companies will be focused on building and managing the contractor network. The Companies will work to expand recruitment to increase program volume throughout the territories. By taking advantage of direct contractor account management capabilities, the Companies will increase engagement with contractors to build strong partnerships. The implementation contractor and the Companies will continue to promote NYSERDA and other valuable manufacturer or third-party trainings. There is opportunity to customize these recommendations based on program activities and QA/QC results to improve overall contractor performance.

5.D.3 **Marketing and Outreach**

The new implementation contractor will assist the Companies in the development and implementation of the Companies' marketing plans specific to heat pumps and heat pump water heaters during the fourth quarter of 2020 and into 2021.

The marketing plan will specify strategies for expanding customer awareness of and interest in heat pump technologies for space conditioning and water heating. The marketing effort will have several key features:

Focus on Maximizing the Benefits of Heating with Heat Pumps: As described in the body of this Plan and working in collaboration with NYSERDA and other utilities, the Companies' marketing efforts will include a focus on the environmental benefits of heat pumps, in addition to the economic benefits, when they are used effectively for heating. This effort will include, but not be limited to:

Market channel focus: The fact that heat pump technology is broadly applicable across the major market sectors (residential, multifamily, small commercial and large commercial and industrial) presents special challenges for building customer awareness. It is important to clearly educate customers about the specific heat pump technologies that are appropriate for the buildings in which they live or work. Marketing materials therefore need to help customers navigate the options that are available to them. For instance, residential customers who live in homes with centrally ducted furnaces and air conditioners are best matched with central ccASHPs or GSHPs, while customers in home that don't have ductwork should understand that MSHPs are probably the best option for them. This type of education extends across commercial sector building types, as well. Marketing tactics and materials will help break these options down and, importantly, direct customers to get in touch with a participating contractor to learn more.

Leverage NYSERDA and Other JU Marketing Resources: The Companies and their implementation contractor will leverage the marketing resources of NYSERDA and the other utilities to harmonize customer outreach and education messaging and leverage resources in the development of website content, program collateral, and marketing tactics. This will effectively utilize Company budgets and increase the effectiveness of marketing campaigns conducted both

by the Companies and by neighboring utilities. In addition, the Companies will collaborate with NYSERDA and Participating Contractors to access NYSERDA cooperative advertising support, subject to adherence to mutually developed advertising branding and messaging guidelines and requirements.

Focus on Contractor Education: Because program success relies on a well-educated and motivated contractor network, the Companies in coordination with the Joint Efficiency Providers, will emphasize effective contractor training and education. This will include materials that help contractors effectively sell full-load heat pump systems, as well as strong communications to make contractors aware of trainings being provided by NYSERDA, manufacturers, distributors, or third-party training providers.

Dated: March 16, 2020

Respectfully submitted,

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. and ORANGE AND ROCKLAND UTILITIES, INC.

By: */s/ Mary Krayeske*

Mary Krayeske
Assistant General Counsel
Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003
Tel.: 212-460-1077
Email: krayeskem@coned.com

CENTRAL HUDSON GAS AND ELECTRIC CORPORATION

By: */s/ Paul A. Colbert*

Paul A. Colbert
Associate General Counsel –
Regulatory Affairs
Central Hudson Gas and Electric Corporation
284 South Avenue
Poughkeepsie, NY 12601
Tel: (845) 486-5831
Email: pcolbert@cenhud.com

NATIONAL GRID

By: */s/ Karla M. Corpus*

Karla M. Corpus
Senior Counsel I
National Grid

300 Erie Boulevard West
Syracuse, New York 13202
Tel: (315) 428-5080
Email: karla.corpus@nationalgrid.com

NEW YORK STATE ELECTRIC & GAS CORPORATION and ROCHESTER GAS AND ELECTRIC CORPORATION

By: */s/ John Forbush*

Amy A. Davis
Senior Regulatory Counsel
89 East Avenue
Rochester, NY 14649
Tel.: (585) 724-8197
Email: amy.davis@avangrid.com

NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT (NYSERDA)

By: */s/ Laura Rowe*

Laura Rowe
Senior Counsel
NYSERDA
17 Columbia Circle
Albany, NY 12203-6399
P: 518-862-1090
Email: laura.rowe@nyserda.ny.gov

Appendix 1: NYS Clean Heat Market Development Plan

Overview of NYSERDA's Marketing-Enabling Initiatives for Building Electrification

To achieve the statewide heat pump goals and build the market infrastructure for a low-carbon future, the NYS Clean Heat incentive program will be implemented in coordination with a portfolio of market development initiatives. NYSERDA will invest approximately $230 million in market enabling initiatives funded through Clean Energy Fund (CEF). This appendix provides an overview of the NY Clean Heat Market Development Plan. Additional information can be found in the referenced CEF Investment Plan Chapters, which NYSERDA publicly files in NYS PSC Matter Number 16-00681 and posts at www.nyserda.ny.gov/cef.

Across its component initiatives, the NYS Clean Heat Market Development Plan aims to build market capacity to deliver building electrification solutions – including cold climate air-source heat pumps (ccASHP), water- and ground-source heat pumps (GSHP), and heat pump water heaters – in order to meet the following central goals by 2025:

- Help achieve the state's energy savings targets from the installation of heat pumps.
- Increase the pool of skilled labor needed to grow a quality-oriented industry, training 14,000 workers across the heat pump supply chain, including 4,200 workers to sell, design, and install systems.
- Reduce the cost of heat pump installations by at least 25%.
- Increase stocking of heat pumps by 50% above 2019 industry shipments and increase penetration of high-performance cold climate heat pumps to 90% of all heat pumps shipped for space conditioning in New York.

The Market Development Plan is designed to address critical barriers and market needs, as outlined in Table 1. Specific initiatives and target outcomes are described below.

Table 1. NYS Clean Heat Market Development Plan

Critical Market Need	Budget (Millions)	Initiative	Initiative Budget (Millions)
Train and develop the needed clean heating and building electrification workforce	$38.2	Workforce Development	$38.2
Build consumer demand and market confidence and reduce customer acquisition costs	$60.9	Marketing	$19.2
		Community Campaigns	$10.0
		Critical Tools	$4.0
		Technical Assistance & Audits	$27.7
Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations	$60.0	Clean Thermal District Systems	$15.0
		HVAC Technology Challenges	$15.0
		* Empire Building Challenge	$15.0
		* Multifamily Building Demonstrations	$5.0
		Exploratory Cost Reduction Strategies	$10.0
Make electrification solutions available for LMI consumers	$31.0	LMI	$31.0
Make products available when and where consumers need them by building the clean heat supply chain	$12.0	Clean Heat Supply Chain	$12.0
Minimize winter electrical peak by investing in demand reducing “heat-pump ready” solutions	$26.5	Comfort Home	$26.5
Develop a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings	$1.0	Building Electrification Roadmap	$1.0
Total			$229.6

* Funding estimated for building electrification; initiative will include other low-carbon solutions.

1. **TRAIN AND DEVELOP THE NEEDED CLEAN HEATING AND BUILDING ELECTRIFICATION WORKFORCE**

Objective: Train and develop the skilled labor needed to grow the nascent heat pump industry alongside market demand, providing jobs and career pathways for New Yorkers and upskilling existing workers

Investment: $38.2 million

Overview: NYSERDA's workforce development and training strategy targets high growth or high need sectors and works in partnership with clean energy employers, in order to deliver the skills needed by employers and to support job placement. Consistent with this strategic approach, NYSERDA will increase its workforce training investments to advance the state's building electrification and energy efficiency goals, specifically through its **Talent Pipeline** and **Building Operations and Maintenance (O&M) Industry Partnership** workforce initiatives.

Approximately $38 million of NYSERDA's total workforce budget will target the clean heat and building electrification workforce, addressing critical workforce development needs for heat pump installers, drillers, technical sales staff, architects and engineers, building operators, and new market entrants. This investment will focus on developing the necessary skills and hands-on experience to enable current and future workers to deliver building electrification solutions to meet New York's growing needs for a low-carbon building stock.

Key activities will:

- Prioritize support for populations including veterans, low-income individuals, formerly incarcerated individuals, and former power plant workers and other displaced workers – to support disadvantaged workers and a just transition to a clean energy economy.
- In collaboration with utilities, provide targeted training to address workforce needs related to the NYS Clean Heat incentive program, including training needs identified through routine quality assurance (QA) inspections, evaluations, and customer and contractor feedback.
- Enhance HVAC and heat pump curriculum, provide training equipment, train trainers, support degree, apprenticeships and certificate programs, and develop more hands-on and on-site training to meet the skills and job placement needs of clean energy employers. Focal areas for heat pump training include support for manufacturer-sponsored installation training for ccASHPs that includes a cold climate sizing and design focus, applying Manual J procedures to perform residential load calculations, design of complex systems in large buildings, integrated controls, and technical sales.
- Provide community-based training and cooperative training with industry/manufacturers that meets regional needs for heat pump and other clean energy labor, delivering low-and no-cost training to critical links in the supply chain (e.g., installers and sales staff, architects, engineers, and municipal officials).
- Provide businesses with wage support for on-the-job training for new hires, including enhanced wage support for disadvantaged workers and for businesses that install heat pumps.
- Pursue partnerships with owners of buildings (or portfolios of buildings) that have large energy expenditures to advance the skills of their building operations and maintenance workers.

- Develop career pathways in HVAC and heat pumps for disadvantaged workers, training new workers through partnerships with educational and training institutions and the trades. Initiatives will include classroom- and hands-on training, internships, apprenticeships, and job placement, with requirements to work with low- and moderate-income individuals, women, people of color, veterans, disconnected youth, and individuals in Environmental Justice communities.

Target market impacts: Working in partnership with businesses, training institutions, utilities and communities, this investment will provide building electrification training support for 4,200 heat pump installers; 2,700 entry level jobs for priority populations; 5,500 architects, engineers, college students and other technicians; and 1,600 workers trained in heat pump system O&M practices – helping meet the labor needs associated with the state's 2025 heat pump target and positioning vocational and training institutions to support the long-term transformation of the way New Yorkers heat and cool buildings.

For more information, see NYSERDA's CEF *Workforce Development and Training Chapter*.

2. BUILD CONSUMER DEMAND AND MARKET CONFIDENCE AND REDUCE CUSTOMER ACQUISITION COSTS

Objective: Build consumer demand for and market confidence in heat pumps, and reduce customer acquisition costs for installations, by providing consumer education, community engagement, and timely decision-quality information.

NYSERDA will undertake multiple complementary initiatives to meet this market-enablement need.

2.1. NYSERDA will support consumer awareness and lead generation via two marketing initiatives: **NYSERDA and Utility Co-branded Marketing** and **NYSERDA and Contractor Co-op Marketing.** The objective of these marketing efforts is to increase New Yorkers' awareness of heat pumps as an option for heating and cooling homes and businesses, improve consumer perceptions, and increase demand and reduce customer acquisition costs for heat pump installations and energy efficiency projects.

Investment: $19.2 million

Overview: NYSERDA and utility co-branded marketing activities will provide customers with a trusted source of information before and during their decision to purchase. NYSERDA also will enhance its cooperative ("co-op") advertising activities with clean heating and cooling industry partners to enable contractors participating in New York State's heat pump programs to market to grow their business and build market demand.

Key activities will:

- Develop a central online landing environment for NYS Clean Heat that will serve as a resource for the customer, segment the customer's offers based on their utility company and geography, and drive to qualified contractor listings.
- Co-brand heat pump outreach and awareness campaigns with the utilities, to leverage the name recognition of both the utilities and NYSERDA and drive market uptake.

- Support marketing campaigns that target customers who have a higher propensity to adopt clean heating and cooling technologies, including broad-based marketing to targeted geographies, hyper-targeting customers based on characteristics of their home and heating fuel, or reaching customers who are actively searching to replace their HVAC equipment.
- Continue co-op advertising, which offers clean heating and cooling industry partners marketing funds and materials; planned enhancements include templated ads, opt-in opportunities, and re-targeting.
- Coordinate with trade allies (including manufacturers, distributors, contractors) and community groups to maximize reach and frequency in advertising and deliver a consistent message regarding the benefits of cold climate heat pumps.
- Deliver in concert with community campaigns (described below) to maximize impact.
- Test and refine marketing approach, messages and effectiveness throughout.

2.2. NYSERDA will pursue **Community Campaigns** with the objective to provide support to communities and local groups to stimulate adoption of heat pump technologies along with building envelope solutions, while leveraging local labor and facilitating soft cost reduction.

***Investment*:** $10 million

Overview: Community-led campaigns help move customers from intent to purchase. Through Clean Heating and Cooling community campaigns, NYSERDA supports communities in implementing multi-year campaigns that help homes and businesses in the same area install heat pump technologies through locally organized community outreach. These campaigns are similar to the *Solarize* campaigns which have become common across the region. Campaigns can select an installer competitively and negotiate to reduce installation costs.

Key activities will:

- Continue, extend, and expand existing Clean Heating and Cooling community campaign activity.
- Expand NYSERDA's comprehensive toolkit of materials and leverage complementary resources and technical assistance that NYSERDA's Clean Energy Communities program offers to local governments.
- Explore additional aggregation strategies such as via buying groups, community organizing groups, affinity groups, homeowners' associations, and developers.
- Target marketing in communities with campaigns and leverage data on enrollees to increase effectiveness.

2.3. NYSERDA will develop and publish **Critical Studies, Tools, and User Guides** for contractors and consumers, with the objective to address market concerns or barriers and to make it easier for consumers to adopt clean heat solutions.

***Investment*:** $4 million

Overview: NYSERDA will develop resources that range from market analysis to user guides.

Key activities will:

- Develop user-friendly resources to aid consumers in their decision-making and contractors in adopting good industry practices, including the identification of standardized heat pump packages for common buildings types in New York State, tools to support good practice heat pump design and selection, and a prioritization tool for energy efficiency investments.
- Provide assistance to the market and utilities in developing appropriate quality assurance and quality control protocols for heat pump deployment programs to improve customer satisfaction and build customer confidence in this nascent market.
- Conduct market research and analysis to address critical market challenges (e.g., refrigerant management); to assess potential impacts as markets shift and new challenges emerge; and to support the evolution of the statewide heat pump program framework.

2.4. NYSERDA will offer **Technical Assistance and Audits** with the objective to build customer confidence and provide consumers with decision-quality information to enable uptake of energy efficiency and heat pumps.

***Investment*:** $17 million for commercial and multifamily buildings and $10.7 million for residential homes

Overview: NYSERDA will leverage technical services to provide guidance and direction to building owners to make investments in building electrification and clean heating and cooling technologies.

***Key activities will*:**

- Support 1,000 large building electrification screening studies and 300 site-specific technical assessments for commercial and multifamily buildings, through the FlexTech Program.[48]
- Expand large building screening program to natural gas constrained areas as needed.
- Invest in outreach/concierge resources to focus on large portfolio companies.
- Support 112,000 residential energy audits, through the Green Jobs – Green New York Residential Audit Program.[49]

Target market impacts: Across the suite of initiatives focused on building consumer demand and market confidence, NYSERDA has defined impacts by major market segment.

For large commercial and multifamily buildings, NYSERDA will provide 1,300 building owners with reliable information and will complete building electrification feasibility studies with the 20 largest property owners in the state, ultimately driving heat pump installations in a target of 325 large buildings.

---

[48] NYSERDA's Flexible Technical Assistance (FlexTech) Program shares the cost to produce an objective, site-specific, and targeted study on how best to implement clean energy and/or energy efficiency technologies. See: www.nyserda.ny.gov/flextech.

[49] For one-to-four family homes, NYSERDA offers a no cost home energy audit conducted by participating residential auditors. See: www.nyserda.ny.gov/All-Programs/Programs/Energy-Audit-Programs.

For the small (one-to-four unit) residential sector, NYSERDA's marketing and engagement activities will generate one million leads and NYSERDA will complete 112,000 audits targeting electrification, helping to support 100,000 residential heat pump installations by 2025. On average, NYSERDA expects to invest $400 per residential heat pump installation for marketing, community campaigns, and home audits, while leveraging $13 million for marketing through industry co-op advertising. NYSERDA estimates that enabling streamlined field and administrative procedures and novel customer targeting and sales approaches will reduce the customer acquisition costs experienced by contractors by $28 million through 2025. In time, engaging communities and raising consumer awareness will drive more clean energy actions and local clean energy policies.

For more information on these initiatives see the following CEF Chapters: *Clean Heating and Cooling*, *Multi-Sector Solutions (*Technical Services*),* and *Residential*.

3. DRIVE PERFORMANCE IMPROVEMENTS, REDUCE COST, AND DELIVER NEW ECONOMIC SOLUTIONS THROUGH TECHNOLOGY INNOVATION AND DEMONSTRATIONS

Objective: Invest in technology innovation and demonstrations to develop, demonstrate, and de-risk building electrification solutions that can deliver better performance, cost reduction, and new economic solutions for a wider range of building types.

NYSERDA will invest in several initiatives to develop next generation technologies and business models, with milestones and impacts defined for each initiative.

3.1. NYSERDA's **Clean Thermal District Systems** initiative will test and demonstrate potentially scalable models for clean thermal district systems that leverage economy-of-scale or Energy-as-a-Service (EaaS) models at new and redevelopment sites (e.g., campuses, downtown corridors).

***Investment*:** $15 million

***Overview*:** A clean thermal district heating and cooling system includes a network of underground water pipes delivering either thermal-source/sink services used by heat pumps installed in many buildings, or hot/chilled-water services used by heat exchangers installed in many buildings. NYSERDA will help develop and demonstrate clean thermal district systems and related business models that can drive cost reductions and make ground-source heat pumps accessible for more customers.

Key activities will:

- Provide technical assistance (for scoping) to fund initial scoping, pre-development and environmental impact studies. Scoping studies are expected to identify anchor customers, appropriate heat sources/sinks, and opportunities to dovetail with other major construction projects on the horizon. Studies may characterize issues regarding rights-of-way or create a request for proposals to recruit additional experts for the next steps of detailed design.

- Provide technical assistance (for design) to cost-share detailed design work that will develop cost estimates and a financial plan for the proposed system; develop draft agreements with customers, including the customer billing structure; and produce schematic drawings of major equipment and systems.
- Provide installation incentives (for construction) to competitively selected clean thermal district demonstration projects, providing "gap" funding to enable construction. Where applicable, NYSERDA will work with the Joint Utilities, LIPA, and NYPA that elect to offer future incentives or financing towards clean thermal district systems. NYSERDA will coordinate with the utilities on potential projects to both share insights as well as to optimize the allocation of ratepayer funding towards heat pump activities.
- Advance related outreach, tools, and training

***Target market impacts*:** NYSERDA will support 20 scoping studies (2021), 8 detailed design studies (2022), and the launch of 2 demonstration projects (2023). This investment will demonstrate viable business models (e.g., thermal Energy as a Service unlocks accessibility/affordability for more customers) and identify and target systemic frictions in the development of clean thermal district systems.

3.2. NYSERDA's **NextGen HVAC** initiative focuses on heating, cooling and ventilation (HVAC) in buildings, with the objective to develop, demonstrate, commercialize, and de-risk solutions that can deliver better performance and cost reductions.

***Investment*:** $15 million

***Overview*:** Activities under NextGen HVAC will be coordinated with the other identified building electrification initiatives. This program will work with commercial/residential property owners to define technical needs and performance specifications, engage the industry and innovation community to deliver or tailor products to meet New York building needs, support cost-shared demonstrations of innovative solutions in New York, and leverage opportunities to grow the green economy in New York through industry and university partnerships, investor community engagements, and international partnerships.

Key activities will:

- Determine technology performance and cost needs for technologies including building electrification technologies, seeking market intelligence to understand thresholds that are likely to drive adoption.
- Invest in technology development through competitive "innovation challenges" focusing on opportunity areas including: increasing the output temperature for air-to-water cold climate heat pumps to facilitate reducing the cost of replacing hydronic heating systems, exploring distributed HVAC solutions to reduce distribution losses, advancing peak-reducing thermal storage solutions combined with advanced controls, and technology development for early detection of refrigerant losses and to support the adoption of low Global Warming Potential (GWP) refrigerants.
- Support technology demonstration/validation efforts to test innovations in real-world buildings.
- Provide tech to market support to technology developers to help drive the commercialization of new innovations, specifically to help early-stage companies

navigate the typical channels to market for buildings technologies (e.g., via introductions to key decision makers).

***Target market impacts*:** This investment will support new commercially available heat pump systems that offer higher performance, lower cost, and needed solutions, such as for: cold climate or package terminal applications, cost-effective retrofits for existing hydronic heating systems, integration with thermal storage, and lower global warming potential refrigerants.

3.3. Through the **Empire Building Challenge** and **Multifamily Building Demonstrations**, NYSERDA will accelerate private sector investment in low carbon retrofits for big, tall buildings – with building electrification as a focal solution – and build market confidence in their value proposition.

Investment: $20 million

Overview: There are limited examples of big, tall buildings in climates similar to New York that have conducted retrofits that deliver significant carbon reduction. NYSERDA will partner with owners of big, tall commercial and multifamily buildings to support cost-shared demonstration of low carbon retrofit solutions in these buildings in New York.

Key activities will:

- Convene real estate portfolio owners to develop a shared definition of "carbon neutral" for big, tall buildings and to partner with NYSERDA toward achieving this goal.
- Compile and publish market data that provides OEMs better visibility on the needs and market potential for low carbon solutions for big, tall buildings.
- Support cost-shared demonstration projects of low carbon retrofit solutions in big, tall buildings, competitively selecting projects that show the building owner's commitment and strong potential for replicability, carbon reduction, and cost effectiveness.
- Where applicable, NYSERDA will work with the Joint Utilities and LIPA that elect to offer heat pump incentives to big, tall commercial and multifamily buildings. NYSERDA will coordinate with the utilities on potential projects to both share insights as well as to optimize the allocation of ratepayer funding towards heat pump activities.
- Measure the impact of demonstration projects, assess outcomes, and determine how learnings could be applied.

Target market impacts: NYSERDA will establish partnerships with ten portfolio owners (representing over 100 million square feet of commercial and multifamily real estate) that make public commitments to achieve carbon neutral buildings by 2035 and will fund six retrofit projects that demonstrate replicable and scalable approaches to achieving low carbon buildings.

3.4. **Exploratory Cost Reduction Strategies**

Overview: NYSERDA will support additional cost reduction efforts to be scoped in the future, informed by learnings from the Building Electrification Roadmap and other investigative work.

Investment: $10 million

For more information on these initiatives see the following CEF Chapters: *Clean Heating and Cooling, NextGen HVAC, and Market Challenges.*

4. MAKE ELECTRIFICATION SOLUTIONS AVAILABLE FOR LMI CONSUMERS

***Objective*:** Support the development of electrification solutions for the LMI market segment by addressing institutional barriers to adoption while maintaining or improving energy affordability.

Investment: $31 million

Overview: The LMI market segment consists of nearly half of the occupied housing units in New York State. Realizing the goal of a low-carbon future will require that solutions for electrifying these homes while addressing energy affordability, institutional barriers unique to affordable housing, and consumer protections be developed and scaled. Over the next two years, NYSERDA will invest in research and analysis, demonstrations, targeted incentives, and consumer education to inform the long-term LMI electrification strategy in New York State. As the broader set of electrification strategies contained in the NYS Clean Heat Market Development plan develops the market for building electrification strategies, this investment will inform program modifications, policy, and consumer protections necessary to better address the needs of the LMI consumers and building owners.

Key activities will:

- Develop best practices for utilizing heat pumps for space conditioning and water heating for common LMI building types. Related research and analysis will assess challenges associated with older housing stock such as structural deficiencies and insufficient electric service; examine market, policy, and institutional barriers in the areas of energy and affordable housing to mitigate cost shifts associated with electrification; identify use cases that provide the most benefits to LMI consumers; and identify necessary consumer protections.
- Through demonstrations and pilots, identify replicable models for heat pump deployment in affordable multifamily and single-family buildings. Possible examples include developing a model for delivering heat pumps while improving energy affordability, developing a retrofit prototype for manufactured housing, and pilot aggregation strategies. Replication will be supported through the development of playbooks that provide guidance on implementing successful models for electrification and targeting large portfolio owners and property managers with heat pump solutions.
- Engage market participants such as building owners, property managers, installers, and manufactures to identify early-stage opportunities for such demonstrations and pilots.
- Provide short-term, targeted incentives to offset the cost of heat pump solutions for LMI consumers and building owners where there is a clear energy affordability benefit, such as in the displacement of deliverable fuels. The development and implementation of LMI

incentives will be done in collaboration with the utilities. Additional financial support for heat pump installations in the LMI market segment will be conditioned on minimum building performance thresholds.
- Educate LMI consumers who install heat pumps on how to operate and maintain the system, and coordinate consumer education across direct outreach and the communication channels of utilities, state agencies, local government, and community-based organizations.

Target market impacts Through this investment, NYSERDA will develop a foundation for heat pump deployment in the LMI market segment and inform longer-term utility investment. Targeted incentives and demonstrations will directly support heat pump installations in over 7,500 LMI housing units. To catalyze replication of successful demonstrations, NYSERDA will make specifications and playbooks available for heat pump installation that maximizes energy affordability for LMI consumers and in affordable housing; and NYSERDA will publish data on cost, performance, and energy affordability impacts to improve market confidence. NYSERDA also will help advance policy change in the energy and affordable housing realms to enable the adoption of heat pumps while addressing energy affordability.

5. MAKE PRODUCTS AVAILABLE WHEN AND WHERE CONSUMERS NEED THEM BY BUILDING THE CLEAN HEAT SUPPLY CHAIN

Objective: Draw a larger pool of companies across the supply chain into business activities that make clean heating products and solutions available when and where consumers need them, support and accelerate heat pump adoption, and enable wide-scale deployment statewide.

Investment: $12 million

Overview**:** NYSERDA's **Clean Heat Supply Chain Development** initiative will expand on ongoing work to engage additional companies across the supply chain in providing clean heating solutions.

Key activities will:

- Conduct regional roundtables with distributors, vendors, and OEMs to define and describe the value proposition to the market through "value maps" and "market maps."
- Build and support the activities of a network of trade allies to support the technical transfer and dissemination of training, tools, and resources to a wide range of contractor markets.
- Provide business development support and technical resources to help companies transition to building electrification solutions, focusing first on larger HVAC companies (25+ employees).
- Support improvements to stocking practices and explore midstream interventions in coordination with utilities. NYSERDA will gather best practices from the utilities, such as Con Edison, that are currently offering midstream incentives and have established relationships with distributors.

Target market impacts**:** NYSERDA's investments will support 200 businesses across the supply chain by providing training, tools, technical support, and business development assistance;

secure partnerships with midstream and upstream market actors whose businesses represent at least 80% of heating equipment sales statewide; and increase mid-stream and upstream stocking of clean heating technologies by 50% above 2019 HARDI shipment data for New York State.

For more information, see the CEF *Clean Heating and Cooling Chapter*.

6. MINIMIZE WINTER ELECTRICAL PEAK BY INVESTING IN DEMAND REDUCING "HEAT-PUMP READY" SOLUTIONS

***Objective*:** Build markets for "heat-pump ready" services that provide consumers with improvements in building envelopes (through air sealing, insulation, and windows) to accompany new heat pump solutions, to reduce thermal load and peak energy demands.

***Investment*:** $26.5 million

Overview: NYSERDA's new **Comfort Home** initiative builds markets for "seal and insulate" services in conjunction with heat pump adoption, enabling consumers to save money on HVAC equipment, reduce monthly bills, and create a more comfortable living environment – while reducing peak electricity demands.

***Key activities will*:**

- Develop and deliver simple packages (starting with air sealing/insulation/windows solutions, and potentially expanding as needed) that can reduce customer acquisition costs and deliver more value. Potential expansions could include standardized electrical panel upgrades and solutions for overcoming commonly occurring weatherization barriers.
- Support new business models (e.g., product-based sales of seal and insulate packages) and enable more contractors to offer this service (e.g., develop contractor resource network, provide customer targeting tools and referrals).
- Provide incentives for standardized packages of building envelope measures that improve home comfort and reduce thermal load in approximately 10,000 homes.
- Coordinate with utilities to provide additional "kicker" incentives to promote rapid adoption of heat pump technology following the installation of envelope improvements and to transition to offering combined envelope and heat pump incentives. NYSERDA will coordinate with utilities that are already offering or considering future weatherization program offers and seek to align these offers to avoid market confusion. NYSERDA will provide insights acquired from Comfort Home to support or augment any existing or future utility offering.

Target market impacts: NYSERDA's investment in the Comfort Home program will serve 10,000 households, enroll 70 contractors to offer the heat-pump ready services statewide, reduce contractor average sales cycle times for the packaged measures by 50% relative to traditional home performance approaches, and increase heat pump sales close rates for participating HVAC contractors by 20%.

For more information, see the *CEF Residential Chapter*.

7. DEVELOP A LONG-TERM BUILDING ELECTRIFICATION ROADMAP TO GUIDE THE TRANSFORMATION OF HOW NEW YORKERS HEAT AND COOL THEIR BUILDINGS

Objective: Develop a policy and program framework that can be advanced in New York State to enable energy efficient and cost-effective building electrification for consumers, consistent with the state's low-carbon future.

Investment: $1 million

Overview: In January 2020, NYSERDA launched a Building Electrification Roadmap process as a companion to the ongoing development of a Carbon Neutral Buildings Roadmap for the State.

***Key activities will*:**

- Support a comprehensive analysis of technology and market readiness for efficient electric heat pump solutions by building type.
- Develop a roadmap for advancement of the technical and business model solutions and the policy supports necessary to transform how New York consumers heat and cool buildings.
- Engage industry experts and stakeholders to ensure relevant, informed, and market- and customer-oriented work.
- Model scenarios for achievable market uptake, energy savings, and greenhouse gas emissions reductions from efficient electric heat pumps through 2030.
- Use analysis to guide policy and program interventions, including the refinement of NYS Clean Heat initiatives. Opportunities to refine the market development work include identifying and expanding high-potential building typologies to target for support; identifying building use cases that displace gas heating to target for support; informing investments in technology innovation and demonstrations; and developing additional cost-reduction strategies.

***Target market impacts*:** Through the roadmap analysis and stakeholder engagement, NYSERDA will characterize for each major building typology in New York State a path to develop and scale building electrification solutions that are cost-effective and attractive to building decision makers. NYSERDA will identify public policies and investments that are needed to support the development of a robust 2030 market for these solutions with greater speed, efficiency, and certainty.

These NYS Clean Heat Market Development Plan initiatives will be complimented by the suite of energy efficiency initiatives currently offered by NYSERDA under the Clean Energy Fund including: LMI programs, New Construction programs (supporting net zero new construction), Retrofit NY (developing scalable models for renovating existing buildings to achieve deep carbon reductions), Clean Energy Communities (leveraging local engagement and helping localities achieve their energy goals), the Commercial & Industrial Carbon Challenge (helping business to achieve their carbon goals), Energy Management for commercial and multifamily buildings, and assistance for Schools and Universities – all driving at decarbonizing buildings, leveraging market partnerships, and delivering value

Appendix 2: Verified Gross Savings Specifications for NYS Clean Heat Statewide Heat Pump Program

Verified Gross Savings Specifications	
Date of Filing	NYS Clean Heat Statewide Heat Pump Program Implementation Plan March 16, 2020, Case 18-M-0084
Program Name	NYS Clean Heat Statewide Heat Pump Program
Program Description	The NYS Clean Heat Statewide Heat Pump Program is designed to incentivize residential, multifamily, small commercial, and Large Commercial and Industrial customers to invest in high-efficiency air and ground source heat pump systems that provide heating.
Gross Savings Methodology	Energy savings are calculated by using the formulas and factors/parameters found in the Technical Resource Manual (TRM).[50] Internal QA/QC protocols verify compliance with installation standards and will comply with any future decisions made regarding appropriate QA/QC procedures.
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame. The statewide study is expected to produce utility-specific realization rates by June 2022.
Planned VGS Approach	The Companies are committed to contribute and participate in the statewide EM&V study to be directed by Staff.
Exemption from EAM Status	Heat pump programs will exercise the option for exemption from the application of the realization rate determined through the verified gross savings process, for purpose of energy efficiency-related EAM savings claims, allowed under CE-08: Gross Savings Verification Guidance until completion of the 2022 statewide evaluation review.[51]

[50] http://www3.dps.ny.gov/W/PSCWeb.nsf/All/72C23DECFF52920A85257F1100671BDD

[51] Case 18-M-0084, In the Matter of a Comprehensive Energy Efficiency Initiative, Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025, page 55 footnote 40.

Appendix 3: NYS Clean Heat Program - Glossary of Terms

This glossary provides definitions of key terms used in the NYS Clean Heat Implementation Plan and Program Manual.

Air-Conditioning, Heating, and Refrigeration Institute (AHRI): A trade association representing manufacturers of heating, ventilation, air-conditioning, refrigeration, and water heating equipment. AHRI provides the database of equipment performance specifications, which is used in this program to determine the rebate amount.

Air Source Heat Pump (ASHP): An HVAC system that provides space heating using electricity through vapor-compression refrigeration cycle. An ASHP extracts heat from outdoor air and transfers the extracted heat into the conditioned spaces via various means. ASHPs are also used to provide space cooling by reversing the cycle to extract heat from a building and transfer the heat to the outside air.

Btu/h: Unit of thermal power capacity that represents one British Thermal Unit (Btu) of energy transferred per hour.

Building Cooling Load (BCL): Building total sensible and latent heat gain in British Thermal Units per hour (Btu/h). For residential buildings, BCL shall be calculated using ACCA Manual J or another code-approved methodology. For commercial buildings, BHL shall be calculated following ANSI/ASHRAE/ACCA Standard 183-2007 (RA2017), or other code-approved equivalent computational procedure. Calculation of the building's design cooling load shall be at the 1% dry bulb cooling design temperature for the most relevant ACCA location.

Building Equivalent Full Load Hours (BEFLH): is for heating and cooling based on building type and location. It represents the equivalent full load operating hours for HVAC equipment based on 1% design temperature, TMY3 weather data, and the design heating load.

- Old, poorly insulated buildings constructed before 1979, before the NY State Energy Code went into effect. This vintage is referred to as the "old" vintage.
- Existing, average insulated buildings conforming to the 1980s era building codes. This vintage referred to as the "average" vintage, covering buildings constructed from 1979 to 2006.
- New construction conforming to the 2007 Energy Conservation Construction Code of New York State ("ECCCNYS") for residential buildings. This vintage is referred to as the "new" vintage, and covers buildings constructed from 2007 to present.

Building Heating Load (BHL): Building heat loss in British Thermal Units per hour (Btu/h). For residential buildings, BHL shall be calculated using ACCA Manual J or another code-approved methodology. For commercial buildings, BHL shall be calculated following ANSI/ASHRAE/ACCA Standard 183-2007(RA2017), or other code-approved equivalent computational procedure. Calculation of the building's design heating load shall be at the 99% dry bulb heating design temperature for the most relevant ACCA location.

Central ASHP: An ASHP system that is typically sized to provide heating and cooling to the whole building through an air duct distribution system.

Coefficient of performance (COP): COP is the ratio of work or useful energy output of a system versus the work or energy input, measured in the same units. It is a measure of performance often used for electrically-powered heating and cooling equipment, with the higher the system COP corresponding to the more efficient operation.

Cold Climate ASHP (ccASHP): A heat pump product listed on the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Air Source Heat Pump (ccASHP) Specification and Product List ("NEEP Product List"), designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher). The current specification and listed eligible units are available at (https://neep.org/ASHP-Specification).

Commissioning Report: A report that shows the results of project start-up tests conducted to ensure the system is operating effectively.

Corrective Action: In the Quality Assurance process, action(s) that must be undertaken by a participant at the direction of NYSERDA or the Electric Utility to correct identified nonconformances (i.e., specific deviations or work that fails to meet the established quality standard).

Commercial Unitary (i.e., Large Commercial) ASHP: Large commercial heat pump systems that include individual heat pump appliances that are powered by three-phase electricity or have rated cooling capacities ≥65,000 Btu/h for the individual appliance

Designer: Individual or company that designs heat pump system. Requirements to be an eligible designer in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

Desuperheater: An optional feature of a GSHP system that takes advantage of waste heat generated by the compressor and transfers the waste heat to a domestic hot water system.

Direct Exchange (DX) GSHP: Direct exchange GSHP systems circulate a refrigerant through a buried, closed-loop copper pipe.

Driller: Individual or entity that drills GSHP systems. Requirements to be an eligible driller in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

Energy Efficiency Ratio (EER): A measure of how efficiently a cooling system will operate when the outdoor temperature is 95 degrees Fahrenheit. It is calculated by dividing the rated cooling output at 95 degrees Fahrenheit by the watts used by the AC/HP system. A higher EER means the system is more efficient. It is an instantaneous measure of electrical efficiency, unlike SEER (Seasonal Energy Efficiency Rating), which is an averaged value of efficiency. This is a term applied to air conditioning equipment.

Full Load Heating System: A system installed as a building's primary heating source, with a total system heating capacity that satisfies 90%-120% of building heating load (BHL).

Ground Source Heat Pump (GSHP) system: An HVAC system comprising one or more heat pumps, ground loops, interior distribution systems and terminal units that enables the air and/or

water in buildings to be conditioned by exchanging thermal energy with the ground, ground water, or other natural body of water.

Heat Pump System: One or more heat pump appliances installed in a building to provide partial or full load heating and cooling to the building's conditioned space. The heat pump appliances and associated components may be centrally or separately controlled. In a multifamily building in which a central heating plant serves more than one apartment, the heat pump system must be designed and installed to provide heating to all of the individual apartments and common areas otherwise served by the central heating plant.

Heat Pump System Heating Capacity: For buildings whose BHL exceeds BCL, the heat pump system heating capacity shall be as small as possible to satisfy BHL, while minimizing oversizing for the cooling function to the extent possible with available equipment.

Heat Pump System Cooling Capacity: The sum of the cooling output of all heat pump appliances in the system, expressed in British Thermal Units per hour (Btu/h), at the cooling design temperature used for the building cooling load (BCL) calculation. For buildings whose BCL exceeds BHL, the heat pump system cooling capacity shall be as small as possible to satisfy BCL, while minimizing oversizing for the heating function to the extent possible with available equipment.

Heat Pump Water Heater (HPWH): HPWHs are water heater tanks that heat domestic hot water or process hot water through the use of an onboard air source heat pump that extracts heat from the air in the building surrounding the unit. They use a secondary electric resistance as a back-up to ensure that the water temperature meets the desired setpoint during times of high demand. Air source HPWH models come in two versions (integrated and split-system HPWH) and both versions are eligible for incentives under the program.

Incentive Category: One of nine incentive grouping in the NYS Clean Heat Program reflecting applicable technology type, system size, customer type, and incentive structure. The incentive categories are used to provide clarity regarding eligibility and are as follows:

- Category 1 *ccASHP: Partial Load Heating*
- Category 2 *ccASHP: Full Load Heating*
- Category 3 *GSHP: Full Load Heating*
- Category 4 *Custom*
- Category 5 *HPWH (up to 120 gallons of tank capacity)*
- Category 6 *Commercial HPWH (above 120 gallons of tank capacity)*
- Category 7 *GSHP Desuperheater*
- Category 8 *Dedicated DHW WWHP*
- Category 9 *Simultaneous Installation of Space Heating & Water Heating*

Installer: Individual or entity that installs a heat pump system. Requirements to be an eligible installer in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

International Ground-Source Heat Pump Association (IGSHPA): An association established to advance GSHP technology, which conduct geothermal research and installer training and accreditation.

Mini-Split Heat Pump (MSHP): A type of ccASHP that can circulate refrigerant between an outdoor unit containing a variable capacity compressor and one or more indoor air handlers. MSHPs are often referred to as "ductless mini-splits" because they are typically ductless. These units can also be installed with short duct runs that enable single air handlers to serve more than one room at a time.

MMBtu of Annual Energy Savings: Estimation of first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the site.

Nonconformances: In the Quality Assurance process, specific deviations or work that fails to meet the quality standard established for program requirements, industry standards and quality requirements.

Partial Load Heating System: A partial load heating system is a system installed in addition to an existing heating system, and which has a total heat pump system heating capacity that satisfies <90% of BHL.

Participating Contractor: ASHP and GSHP designer and installer that is eligible to apply for and receive incentives under the NYS Clean Heat Program. To become a Participating Contractor, an entity must submit the statewide Participating Contractor Application and a Contractor Participation Agreement for each electric utility service territory where work will be performed (available at http://saveenergyny.ny.gov/nyscleanheat). Upon approval, the applicant will receive an approval notification from the electric utility and become eligible to apply for incentives in the Program. GSHP drillers must also be approved through this process to become a "participating driller," but are not eligible to submit for and receive incentives. Each GSHP installation must be completed by a participating driller. Contractors installing only HPWH do not have to be a Participating Contractor to submit an Incentive Application on behalf of a customer.

Quality Assurance (QA): QA refers to the process of in-field and photo/desk inspections after project completion, including the resolution of any issues identified during the field or photo/desk inspection, to ensure program requirements, industry standards and quality requirements are met.

Quality Control (QC): QC refers to the process of administrative review, typically while the project is in progress, including but not limited to application review and design review to ensure program requirements, industry standards and quality requirements are met.

Variable Refrigerant Flow Heat Pump (VRF): VRF systems circulate refrigerant between a variable capacity compressor and multiple indoor air handlers, each capable of individual zone temperature control. VRF systems can be built with heat recovery and cooling capabilities that allow simultaneously heating to some zones and cooling to other zones.